Railway Age

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EDITORIAL

Railway Age

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The Awakening of the Technical Societies

The present is a period of general unrest in all industries and strata of society. There is an almost universal clamor for new and changed standards to meet the conditions arising out of the war. This is as true of technical societies as elsewhere. It is particularly true of the older established engineering societies which, because of their large membership and their prominence, have been prone to move slowly and for this reason have become prominent targets for criticism. Recognizing this unrest, the American Society of Civil Engineers created a Development committee early last fall, with broad powers, to study the activities of the society. The other national societies of mechanical, electrical and mining engineers appointed similar committees soon after and all of them have been actively at work for several months. Two of these committees (the civil and mechanical) presented progress reports before the annual meetings of their respective societies last week. The report of the committee of the American Society of Civil Engineers is abstracted briefly elsewhere in this issue. A careful study of the tentative recommendations of this committee will show the comprehensive manner in which it is proposed to revise the society's activities in order that it may interest itself more directly in matters not purely technical or what may be termed welfare work for its members. The report presented to the mechanical society was equally progressive and equally well received. It is to be hoped that the membership at large of these societies may receive the reports with sympathetic attitude, realizing that the problem is theirs to solve and also realizing that they must be willing to render service to the society if they are to expect service from it.

Low Voltage Switch Machines

The low-voltage switch machine is being slowly popularized, but it would seem to be deserving of more general favor. It is in many situations the only practicable and satisfactory device by which a man can move a switch which is situated a long distance from his station, because the ordinary high-voltage dynamo is too costly; and the slowness of the low-voltage apparatus is tolerable because speed of operation is not essential. The use of low-voltage machines at the ends of certain passing sidings has enabled some roads to expedite the movement of trains very materially, and to reduce costs. The desire to operate switches beyond ordinary interlocking limits has led to the development of the low-voltage machine to a highly satisfactory degree. It is operated on 20 volts by a set of primary or secondary batteries, and it gives an indication to the operator as to the position of the switch point. These movements will operate a switch, switch lock, pipe connected derail and detector bar in approximately 35 seconds, while a signal will clear in about 15 seconds. One road has estimated that with the use of these movements the time saved to a train entering a siding will average seven minutes by doing away with the stop necessary to allow trainmen to set the switch by hand. Another road used such machines at switches that could not be seen from the point of operation and where large expenditures would otherwise have been necessary for additional interlocking plants. Their use in connection with power-operated train order signals located at blind sidings and controlled by an operator at a station train-order office a mile or more away also greatly facilitates train movements and cuts down expenses. The use of the low voltage movements at such points is one method worthy of the careful consideration of managements wishing to decrease the running time of trains and lower the operating costs; a study of conditions surrounding their installation at certain places can well be undertaken at the present time in order that work may be started as soon as conditions warrant.

Abatement of the Whistle Nuisance

The railroad superintendent who removes the public's grievances before the public has formulated them comes pretty near being an ideal officer, at least in one element. In the nature of the case, however, acts of that kind are not likely to come prominently before the public, and they remain unknown; so, therefore, we call the reader's attention particularly to that paragraph in the notice, on another page, of the abatement of the whistle nuisance at Tyrone, on the Middle Division of the Pennsylvania Railroad, which says that no complaints of loud whistling had been heard from residents of Tyrone. This bit of news is rather unusual, even novel; we recall nothing of the kind elsewhere. The New York Central formerly had a rule, on the busiest parts of its main line, under which flagmen of trains on the passenger tracks were never called in; and that, of course, abated the whistle nuisance in a very positive way; but if flagmen must go out, and must be called in, an electric circuit, with bells on fixed posts, as at Tyrone, is the ideal means of communication; simple and cheap. Former Commissioner J. E. Sague, speaking before the State Public Service Commission in New York city last week, again reminded us that our British cousins know how to handle a dense passenger traffic without flagging; but, judging by the present rate of progress the adoption of that refinement by our railroads is still far in the future; and the Tyrone experiment might well be considered for adoption at many other places. Reference was made in this column, last week, to the excellent rule, on another division of the Pennsylvania, which has been prescribed for the guidance of trainmen in affording decent treatment to the ears of the people, sick or well, who reside near the railroad; but, as to the noise nuisance, it is no more than right to say that the true way to cut off this dog's tail is to apply the axe directly behind the animal's ears. To put our rules in the best possible language is an important element of good railroading, as is constantly evidenced when clumsily worded rules cause annoyance and friction; but the foolish idea that good rules make good practice still seems to persist in some minds; it is a vigorous weed that has to be killed every Spring—or oftener. Our busiest railroads now have telephones strung along the line at very frequent intervals; and this facility is so inexpensive, comparatively, that many other roads must soon see the wisdom of providing it. With a communicating wire available at every telegraph pole, the continued free use of locomotive whistles is little less than barbarous.

Merely a Business Proposition

Like the adoption of a national budget system as a basis for making appropriations, the creation of a national department of public works embracing all engineering and architectural activities of the government is of such obvious advantage as to appear to require no argument. Yet we have been content to go on from year to year with these activities divided among several bureaus and departments, each ambitious to build up a large organization and without any pretense of coordinating its work with that of the other engineering branches. Thus, building construction is now handled by the Treasury department and river and harbor improvements by the War department; the Coast and Geodetic Survey and the Bureau of Standards are subordinated to the Department of Commerce, while the Bureau of Public Roads comes under the Department of Agriculture. Such a diversification of control necessarily results in much waste of money and energy which would not be tolerated in a business concern and should not be in national affairs. Engineers and business men in general throughout the country have long recognized the extravagance of this policy, or rather lack of policy, but as it is primarily a problem of engineering organization, agitation for its correction has rested primarily on engineers. They have agitated more or less actively and continuously for the correction of this situation for years. This agitation came to a head at a conference of representatives of engineering societies held in Chicago last April when delegates from over 75 organizations with a combined membership of over 100,000 engineers decided to inaugurate an intensive campaign for the concentration of these activities under one department. This has already borne fruit in the preparation of a bill to create a Department of Public Works which will be introduced in Congress in a few days. This bill should receive the active support not only of engineers but of all citizens interested in the economical, business-like conduct of governmental construction activities which run into the hundreds of millions of dollars expenditures annually. The only opposition which has so far manifested itself is that of the Engineers' Corps of the Army which is one of the principal engineering organizations in the present system, whose activities will be revised and placed upon a commercial basis in the proposed plan.

Wire Crossings Over Railways

The question of wire crossings over the tracks is a subject of considerable importance to the railroads from the standpoint of safety. Various associations and others interested in such matters have made extended investigations and studies which have been productive of what they believe to be adequate specifications for the construction and maintenance of such crossings. Some time ago the Bureau of Standards prepared and proposed a revision of a previous recommendation covering signal lines crossing over railways which provides for a distinction between crossings over "important" and "unimportant" railways. Such a distinction is contrary to the 1913 specifications of the Association of Railway Telegraph Superintendents, now the Telegraph and Telephone division, section 1, operation, of the American Railroad Association, which insists that there is no such a thing as an "unimportant" railway, or part thereof, insofar as wire crossings are concerned. It may be inferred by some that there are industry tracks, warehouse tracks, logging roads, spurs, etc., that are "unimportant." Such is the attitude of the Bureau of Standards. As a matter of fact, it is on such lines that the greatest danger frequently prevails. Industry tracks, warehouse tracks and passing tracks are almost always located in the towns along the road and it is at these points where wire crossings are more likely to occur. Trainmen have more occasion to ride the tops of cars while passing through towns than in traveling between them. Curvature, grades, and obstructions to view on account of buildings enter more largely into the problem at these points than on main lines. Another question which should be considered in a study of this matter relates to wire crossings of small line companies such as farmer lines. It is said that there are three such crossings to every one of larger line companies and that as a rule the crossings of the latter are installed and maintained in a safe manner; while as much cannot be said of the small line companies because of a lack of adequate facilities to do proper work on the wires. Several state commissions have advocated legislation which would force most wire crossings to go underneath the tracks, and thus entirely eliminate the hazard attending these crossings.

The Penalty for Deferred Maintenance

In his recent testimony before the House appropriations committee Mr. Hines indicated that deficiencies in maintenance of way and structures could be compensated for in considerable measure by an excess in the condition of equipment over that of January 1, 1918. Nothing was said as to the unit of measure to be applied in thus balancing maintenance of equipment against maintenance of way and structures, but owing to marked changes in values almost any unit that could be proposed would present serious objections. Whatever the unit, there is one phase of this plan of balancing over-maintenance against under-maintenance that cannot be readily measured. Maintenance deferred cannot be restored in the future for the same outlay as would have sufficed if undertaken in season. For instance, recent measures to reduce maintenance of way activities have been instrumental in curtailing the season's painting program. Not only will the postponement of this work entail the expenditure of a much greater amount of effort when the work is eventually done, in cleaning off rust and blistered paint, but it will result in a deterioration of the structures that cannot be restored by any process short of renewal. It is to be admitted that this is probably an extreme case. Nevertheless, the same principle applies to nearly all items of maintenance work and surely ought to receive proper recognition when the government undertakes to compensate the roads for inadequacies in maintenance expenditures.

Highways and Railways

The last decade has seen a marked increase in the use of motor vehicles for passenger and freight traffic on public highways with promise of even greater development in the near future. The resulting density and speed of highway travel have led to radical changes in the physical requirements of the public roads. Where steep grades and sharp curvature were formerly objected to as sources of discomfort, they are now considered positive obstructions to traffic and on all important routes of travel the demand for improvements in grade and alinement are most insistent. This condition has become manifest to railway men wherever a grade crossing elimination problem brings railway and highway officers together. Flat skew bridges are now often demanded where detoured square crossings would formerly have sufficed and long approach grades are now specified where short dips would have served in the past. This condition has an important bearing on the distribution of the cost of such work. It has been recognized for no little time that the public, as sponsor for the highway, should bear a fair share of the expense, but now that these costs are tending to increase rapidly because of the refinements in highway design, it is but justice that the increased costs should be borne by the public which benefits by the improvements.

A Useful Study of the Collision Problem

THE HEARING before the New York State Public Service Commission on the prevention of collisions, reported in our last issue, brought out many interesting statements of fact and opinion; and the full proceedings, when printed, will afford profitable reading and should mark progress. By this we do not mean that any one said much that was new; but it is a good thing to have the issues crystallized. Mr. Rhea, with his well-known frankness, set forth some of the fundamentals with a succinctness that might well be imitated in many quarters. Mr. Sprague, from his intensive studies, presents certain points of the problem in incisive terms. Extracts from his remarks will be found on another page of this issue. Messrs. Schweyer and Webb spoke with sanity and force, showing that they are not mere dreamers or promoters, but practical engineers. Mr. Sprague's gentle reminder that the old stagers do not know it all, and Mr. Patenall's call for more business-like co-operation between the railroads and the unorthodox inventors, both deserve attention.

A State Commission must recognize all interests, and it was proper to listen to the enginemen and firemen; but the spokesmen for these had nothing constructive to offer. Their urgent demand for more thorough protection of trains by flagging is logical enough, but they seem to forget that the diseases of the flagging system are incurable.

These commissioners may or may not have an important duty in connection with the settlement of the collision problem. The problem surely has to do very directly with the police power and therefore comes within the authority of the State of New York, although at the same time it is a national problem, demanding settlement on such lines of uniformity and conservatism as to insure the best progress, and the least waste, throughout the whole country. The New York commissioners have set forth, in their report on the South Byron collision, some very practical ideas; and if, by promptly propounding a very sound and practicable plan, they should forestall the slow-moving Washington authorities, their ideas would at least deserve careful attention. Just now they could not order the installation of apparatus on any important road without the consent of the United States Railroad Administration; but that condition will soon be changed.

It is fair to assume that Mr. Rhea sees straight when he says that public sentiment demands that the automatic stop problem be brought to a more definite issue. Why should the railroads of America longer delay the settlement of the question? Can discipline be further improved? Look at the more recent startling collisions. Mount Union (Feb. 27, 1917); Ivanhoe (June 22, 1918) and South Byron (Jan. 12, 1919) afford significant evidence that the further improvement of our methods of discipline is an exceedingly complicated problem. Those who say that the case is hopeless cannot be answered. In each of these cases the engineman had not had enough sleep, and the fireman was of no value as a monitor. Regulating enginemen's sleep appears to be an impossible task. The monitorship of the fireman has never been of any proved value. Where trains are not more than three minutes apart, the benefit from the flagman's function is very uncertain, and this degree of frequency of trains is now common on all of the principal roads.

Automatic stops have been used on the Boston Elevated for twenty years and their value as a disciplinary element has been well proved. The Chicago & Eastern Illinois has been using a stop on both passenger trains and freight trains for three or four years. The Great Western of England has 100 engines equipped with automatic stops and has been using cab signals for 12 years. With these several bodies of evidence before us can it not be said that some, at least, of the unsettled questions have been settled? The United States Railroad Administration began examining the question of prevention of collisions after the Nashville wreck in July, 1918; but the investigating committee was not appointed for six months thereafter, and has not yet made a report. The New York State Public Service Commission has been six months considering what to do about South Byron. What good reasons can be given for these delays? A very competent experienced and conservative signal engineer, who has studied this subject for many years, remarked recently that the minds of the people (railroad officers included) seem to work in a cycle; we have serious collisions which an automatic stop would have prevented, and everybody feels the need of such a device and the call for it is definitely voiced; and then there is a period when no very bad collision occurs and "everybody seems more or less contented with things as they are." This view of the case is old, and would scarcely be worthy to be quoted at this time, except that it comes from a railroad officer peculiarly well qualified to take a correct view; and it was spoken after he had had very good opportunity to know the feelings of the directors of his own road. It is the directors of the railroads to whom falls the duty of finally dealing with this problem.

Railway Rates and Cost of Living

A THEORY regarding the effect of railway rates upon the cost of living has been enunciated by persons in high positions, which requires discussion. Commissioner Woolley of the Interstate Commerce Commission has presented it in a recent address as an argument, as we understand it, why rates should not be advanced at all, at least for some time. The theory referred to is that an advance in freight rates results in an increase in the cost of living which exceeds the advance in rates, and may even be three or four times as large. This is attributed to the alleged fact that when freight rates are advanced, business concerns use the advance in rates as an excuse for advancing their prices much more than enough to cover the increase in rates.

If this argument were sound, it would be conclusive against advances in rates at any time, and especially at a time when the cost of living is so high as at present. But with all due respect to the eminent government officials who have made it, the *Railway Age* challenges its correctness and asserts that it cannot be successfully defended either on economic principles or by the concrete evidence of experience.

Why should an advance in freight rates have a different and greater effect upon prices to the consumer than an advance in any other kind of cost entering into the production and marketing of a commodity? To the manufacturer and merchant freight rates are merely one of their costs of doing business, like wages, prices of raw materials, cost of advertising, etc., and, considering the matter from a purely abstract point of view, there does not seem to be any more reason why it should be assumed that an advance in freight rates would result in a disproportionate increase of prices to the consumer than would an increase in wages, or taxes, or selling costs.

But it is not necessary to consider the question merely in the abstract. Freight rates actually have not produced any such effects. There were vast increases in the cost of living before any of the recent large advances in freight rates occurred. A little over a year ago the Railroad Wage Commission made an investigation of the increase in the cost of living and estimated that between December, 1915, and December, 1917, it had been about 45 per cent. During this period there had been no material advance in freight rates. On the contrary, the average rate per ton per mile was lower in 1917 than it was in 1915. It is a poor rule that does not work both ways in economics as well as in other matters. If an advance in freight rates would have such an important effect upon the cost of living, as is claimed, why did not the stationary position of railway rates

during this period keep down the cost of living? Mr. Woolley has indicated that freight rates ought to be "pegged" in future to prevent an increase in the cost of living. But they were very effectively pegged by the regulating authorities during the two years mentioned, and meantime the cost of living increased 45 per cent.

What has occurred since freight rates were advanced? The advance in eastern territory in 1918 was approximately 35 per cent and in the rest of the country 25 per cent. On the theory that any advance in freight rates results in a relatively much larger increase in the cost of living, it would appear that the increase in the cost of living, since these advances in rates were made, should have been much larger than it was before. If no advance in rates is accompanied by an advance of 45 per cent in the cost of living then it would appear that an advance in rates of 25 to 35 per cent should, on this theory, have resulted in an increase in the cost of living of at least 50 to 100 per cent; but really it has been much less than it was before.

Both reason and experience refute the argument that an advance in freight rates has any effects upon the cost of living which differ in kind or degree from the effects produced by an increase in any of the other costs of doing business. Freight rates are a factor in determining the prices at which goods are finally sold to the consumers and, therefore, affect the cost of living. But the same thing is true of every other element of industrial and commercial costs. Nobody would contend that the farmer, the manufacturer and the merchant should not advance their prices when an advance in prices is necessary in order to enable them, as classes, to offset increases in their expenses of doing business. There is no more ground for keeping down railway rates when an advance in rates is needed to cover advances in the cost of rendering the service of transportation, than there is for not advancing the prices of commodities when advances in them are needed to cover increases in the cost of producing and marketing them.

One most important point which seems to be overlooked by those who oppose advances in freight rates because of the supposed effect upon the cost of living is that if rates are not advanced and the government continues to guarantee the returns of the railroads, as Mr. Woolley suggests, taxes must be collected from the public in order to pay railroad deficits caused by the failure to advance the rates. Now, the effect which an increase in taxes produces is not exactly the same upon all classes of people as the effect of an advance in railway rates. The relative effects are influenced by the differences in the incidence of the taxes and railway rates. But, in the long run, a half billion dollars in taxes levied to pay a railroad deficit of that amount imposes as much of a burden upon the consuming public as would an advance in rates of a half billion dollars made to prevent the deficit from being incurred. Most taxes, like most freight rates, are finally passed along to the consumer. Furthermore, when all the cost of rendering transportation service is covered by the rates charged for it, the railways are almost certain to be more efficiently and economically operated than when the rates are made such that a deficit is incurred and the loss is recouped by taxation. One reason why government managed business almost always are extravagantly managed is that the managers know if they do not make them earn enough to pay expenses, the deficit can and will be defrayed from the public treasury.

Perhaps Director-General Hines is right in taking the position that an advance in rates should not be made until normal conditions have been restored and the amount of the advance which must be made, in order to cover all costs, including capital charges, can be accurately ascertained. But to talk about permanently keeping railway rates too low to cover the total cost of rendering the transportation service, as a means of holding down the cost of living, is, we submit, to talk economic nonsense.

Letters to the Editor

Reply of Corps of Engineers, U.S.A., to Proposed Dept. of Public Works

WASHINGTON, D. C.

TO THE EDITOR:

The long expected response of the Corps of Engineers, U. S. A., to the activities of the engineers, architects and constructors of the country looking toward the establishment of a National Department of Public Works has been made. It is in the form of a bill designated S. 1376, 66th Congress, 1st Session, introduced into the Senate on June 5, 1919, by Senator Ransdell, of Louisiana. It may be inferred that this senator is not prepared to father the measure for the customary legend at the head of the bill contains the additional words "by request" after Senator Ransdell's name.

The bill is 35 pages long and contains 29 sections. It proposes to create an "Auxiliary Engineer Corps" in the United States Army for duty on works of public improvement —a non-combative corps of engineers which shall be "under the command and direction of the Chief of Engineers, U. S. A. . . . "Its personnel shall be assigned by the chief of engineers to duties under his charge; specifically on river and harbor improvements, inland waterways, locks and canals, fortifications, embankments, levees, dykes, breakwaters, piers, and in the supervision and in the construction of national highways and bridges, and to any other public work that shall be now or hereafter assigned to the chief of engineers under the War Department. This organization shall also perform the duty of guarding and protecting all national public works."

Whether or not the foregoing language places the construction of national highways and bridges under the chief of engineers and thereby increases the authority of the engineer corps beyond that now conferred upon it, is a question for the lawyers to determine. It may be observed, however, that, even if such authority is not specifically conferred, the language creates an "open sesame" and one is reminded of the ancient legend concerning the camel who received permission to place his nose in the tent. The bill is too long and comprehensive to be reviewed adequately here, but those who read it will have no question that it is the first step in the attempt, of which many of us have been aware, to militarize the public works functions of the federal government.

The Engineers, Architects and Constructors Conference on National Public Works took action at the recent Chicago meeting directly opposite in spirit and purport to that proposed under S. 1376. Therefore the officers of this federation are in duty bound to oppose this bill. In order that the engineers, architects and constructors of the country may be informed concerning the first steps taken in opposition the letter to Wesley L. Jones, chairman of the senate committee on commerce, to which the bill has been referred, is reproduced below.

"On June 5, Senator Ransdell introduced into the Senate, 'by request' a bill to create an auxiliary engineer corps in the United States army for duty on works of public improvement. It is numbered S. 1376 and has been referred to the committee on commerce.

"I have the honor to be chairman of a federation of societies with an aggregate membership of 105,000 engineers, architects and constructors. This federation, which is known as the 'Engineers', Architects' and Constructors' Conference on National Public Works,' is opposed to the provisions of the bill above named, and at its convention in Chicago, April 23 to 25, adopted a program contrary thereto in all respects.

"On behalf of the federation aforesaid, I respectfully request that when the committee on commerce designates S. 1376 for hear-

ing, said federation be given an opportunity to prepare and present its views.

"For more than 40 years, the engineers, architects and constructors of the United States have almost unanimously been advocating the consolidation of the engineering and construction work of the government into a department of public works. The United States stands practically alone among the great and small nations of the world in that it has no such department. The matter has been considered and acted upon from time to time by various engineering societies throughout the country but all efforts have heretofore been futile for two reasons: (a) the engineers, architects and constructors of the country have given local and sporadic rather than united and continuous support; (b) the corps of engineers of the United States army has always been able to defeat any proposal that has thus far been advanced to Congress. The engineers, architects and constructors of the country are now united and they propose to present to Congress in the near future a well considered plan for a Department of Public Works that will correct the present chaos in our national construction matters and achieve economy and efficiency.

"I will not burden you now with a detailed statement of the reasons which, after more than 40 years of mature consideration by well balanced men, prompt the forthcoming recommendations. With respect to S. 1376, we shall in due time endeavor to substantiate our belief that there is no more sure, certain and insidious way of accomplishing militarism in the United States than through the militarization of our public works. Heretofore, this militarization has extended principally to the rivers and harbors operations with results that have repeatedly been characterized in a way not at all favorable to the corps of engineers. The bill S. 1376 extends army control to public roads, bridges 'and any other public work that be now or hereafter assigned.' This bill is merely a part of a very ambitious plan to place the army in the saddle over all engineering operations of the government.

"The genesis of S. 1376 is well known. You will find attached hereto a sample of propaganda circulated among the civilian force of the corps of engineers through the district office in New Orleans. It is hardly necessary to remind one as familiar with official army procedure as yourself that no civilian attached to the corps of engineers would be so venturesome as to distribute this amazing circular without 'knowledge and consent' of headquarters at Washington.

"It is a very long way from the war department to the capitol if one goes *via* New Orleans. The engineers, architects and constructors of the country are coming to the doors of Congress very soon, with a respectful petition which will be the result of 40 years of the best engineering thought. But in so doing, we shall remember the fundamental engineering axiom that a straight line is the shortest distance between two points."

Reference in the foregoing letter to organized propaganda will be made clear by the following abstract of the circular sent out from the district office of the engineer corps at New Orleans:

"*Strictly Personal.*—The purpose of this letter is to enlist all chief clerks in the U. S. engineer service in a 'push' to shove a bill through Congress for mobilizing an auxiliary engineer corps. A bill for this purpose was recently placed in the hands of Senator Joseph E. Ransdell with a view to having it introduced by request at the coming session of Congress. This bill provides for a complete organization from top to bottom—non-combative with a military status and under the direction of the chief of engineers, U. S. army, with the rank he now has—major-general—and the division engineers with the rank of brig.-general, and the district engineers with the rank of colonel; with provision for ranks for assistants below the district engineer. The corps is to be mobilized from the *experienced* men of *all* classes in the office and field now in the service. Its duties are as now—construction, care of maintenance of public works, and national highways and bridges to be added. Let us talk about national good roads; absolutely necessary for the welfare and prosperity of the nation.

"It provides for a three-year practical training period for all who enter the service and who have had no previous engineer experience before a man can get into the permanent corps, unless he qualifies for a commission before that time.

"It provides graded pay in the various classes of the personnel and also longevity pay of 5 per cent increase for every 3 years service, for eight three-year periods; besides the opportunity, if qualifications justify it, for promotion from class to class with higher pay in such class. It provides also for an efficiency board that shall pass upon the qualifications of the personnel—so that justice is done to all men; with reference to duties performed and rank and compensation, which any member of the corps is justly entitled to.

"It is essential to watch progress at Washington. Essential to have the bill introduced in the coming session, and essential to keep it going till passed

"*When you hear* that the bill is introduced call on your congressman or senator for printed copy.

"Talk for such legislation—be enthusiastic over it—get your business friends to write letters requesting the passage of the bill. Keep at it and don't let it rest. It will take time to get the bill through.

"It may be necessary to keep a man in Washington under pay to '*mark time*' and keep a sharp lookout. All the engineering districts, I feel sure, will rally to the necessary financial assistance."

M. O. LEIGHTON,
Chairman, National Service Committee, Engineering Council.

"Excess Earnings" and Better Transportation

NEW ORLEANS.

TO THE EDITOR:

It would be trite to say that probably the most serious and important problem confronting the people of the United States today is that regarding the future of the transportation lines; and there have been about as many plans put forward for solving it as there have been patented car couplers.

The greatest difficulty that has presented itself with regard to proper regulation of the railroads in the future seems to be how to make an adjustment of rates as between the strong and the weak lines, which will not allow the strong too great compensation and the weak too little.

A number of plans have been suggested to overcome this difficulty, but none seems to be practicable or a proper remedy for the situation. Some of the plans propose to fix a reasonable return as a maximum that should be accorded to any transportation line for its efforts, anything that might be earned in excess of that amount to revert to the government. Another plan—that of the labor organizations—is that the excess should go to the emplyoees or be divided between the government and employees. None of these plans would make for the greatest effort and efficiency in operation.

It seems to the writer that a proper solution would be for the excess to revert to the line which had earned it—not to be paid out in dividends to stockholders, but to be put back into the individual property which had demonstrated efficiency of operation in order to make that operation even more efficient, and to provide greater facilities to the patrons of that individual road who had furnished the business from which this excess had been derived, and who had thereby contributed this excess.

It should be the duty of some governmental agency, in combination with the railroad executives, to see that this money was spent in a way that would inure to the public benefit through increased facilities and better and safer transportation.

It has seemed to the writer that the government originally approached railroad regulation from the wrong angle. At the time it undertook to regulate the railroads many of them were newly built through sparsely settled regions, and if, instead of giving the principal attention to the regulation of rates, they had encouraged the carriers to charge rates reasonable but sufficiently high to show good returns, and then required a fair amount of those returns to be put back into the property for better facilities and conveniences for the public, much better results would have been obtained, not only for the public in general but for the carriers, than through simply reducing rates to a starvation basis.

Transportation as sold by railroads varies in value like any other commodity. Buyers of transportation can afford to pay a better price for good quality than for an inferior grade.

It is very doubtful if, under the most favorable conditions, even the most efficiently operated road will obtain any excessive amount beyond a fair return on its investment for many years to come, but such a plan as described above might be adopted for a period of, say, 5 to 10 years, and if condi-

tions so improve within that period as to make earnings in excess of a fair return on investment too large to be expended on a given property, it is reasonable to assume that the condition of the weaker lines would be likewise improved, making practicable a reduction in rates, thereby resulting in further benefits to shippers and the consuming public.

CHARLES S. FAY,
General Freight Agent, Southern Pacific Lines in Louisiana.

Water Treatment and Anti-Foaming Compound

CHICAGO, Ill.

TO THE EDITOR:

The description given by Mr. Koyl of the water treatment system in use on the Great Northern (*Railway Age*, April 25, 1919, page 1053) is most instructive and the problem as touched upon is of such tremendous importance as to warrant the most extensive and serious discussion. In his summary of the results obtained it seems a little disappointing that Mr. Koyl has not gone into the details of costs. It is evident that the results would justify very considerable expense, but, of course, there is a limit beyond which even the list of benefits recited would not justify the expenditures made necessary. This limit is very evidently the balance between the cost of boiler maintenance and the interest, maintenance and depreciation of the equipment installed for water treatment.

Mr. Koyl states that foaming has not been abolished, but he seems to convey the impression that the present foaming tendencies are only those due to the small amount of calcium carbonate left in the water after treatment. This is not believed to be quite a satisfactory impression under which to close the subject. On the contrary, it seems logical to assume that the sodium salts added and left in the solution by the treatment will actually tend to increase the foaming condition.

This is the experience of nearly every railroad which has installed the wayside treating system described by Mr. Koyl, and there is no good reason to deny or overlook this condition, because the benefits gained from water treatment seem so great as to make it a good and economical practice to acknowledge the foaming tendency and meet it with the consistent and conservative use of anti-foaming placed on the engines.

Curiously enough, there seems to be a decided tendency on the part of water engineers to avoid discussion of this detail, and yet nearly every railroad in the West, using treated water, is also using anti-foaming compound, and rightly so. It makes no difference whether the foaming tendency is natural or artificially created, the argument for its cure is simple and effective, since it is based on dollars and cents, and is not open to difference of opinion.

The use of treated water makes it unnecessary to wash boilers frequently, so far as getting rid of sludge is concerned. Under average conditions, with treated water the boilers could be run much farther without danger of mud burning than they could with the raw water usually available in the same districts, but, unfortunately, after the installation of the treating plants, the boilers must be washed for a new reason—to rid them of the concentration of foaming salts resulting from the treatment.

If, therefore, the foaming tendency can be obviated by increasing the surface tension through the conservative use of anti-foaming compound, we have for comparison the cost of a boiler washout as $4, while the compound used for an additional round trip costs from 40 cents to 80 cents. The sharper engine; the reduction in engine lay-over hours; the proportional obviation of evils resulting from strains of unequal temperatures in cooling and washing and firing up, are all in favor of the use of anti-foaming compound. The above being assumed as facts—and they are—every consideration of the cost of wayside treatment must carry the admission that compounds must still be used on the line and their cost must be added.

Mr. Koyl quotes a letter from the general master mechanic of the central district of his railroad, in which there appears the statement that the boilers are actually being washed every round trip. A later statement by Mr. Koyl is to the effect that the boiler washing in the treated water districts is about half what it was. It is assumed that in those districts not covered by the general master mechanic's letter the boiler washing has been remarkably reduced and probably by the use of anti-foaming compound placed on the engines.

Pitting and grooving not having been abolished, Mr. Koyl states that this is not due to chemical action of the water. It is probable that every operator of motive power west of the Mississippi river would be interested in discovering what does cause this pitting and grooving and how it can be proved that it is not at least partially a result of chemical action. It would also be interesting to know whether it was decreased or increased by the installation of the water treatment.

L. F. WILSON,
Vice-President, The Bird-Archer Company, Chicago.

A Ticket Agent's Reminiscences

KANSAS CITY, MO.

TO THE EDITOR:

I have read with much interest Mr. Cullen's address on the ticket salesman as printed in your issue of April 11, and it takes me back to the old days, the early eighties, when the ticket agent was a salesman of the first rank. Railroads at that time recognized this salesmanship. And not only your own road; connecting lines offered the agent a bonus in the way of commissions. Many an old-timer will recall going out into the country and soliciting passenger business for his road. Many a time the writer, when he had aroused sufficient interest to get them to come into town to start on the trip would explain the routes and rates, and then take the passengers to his home and have his wife entertain them until train time, to keep competitors away.

How different it is now! I went recently to a "modern" ticket office. There were about forty customers, and only ten men to wait on them. I waited 32 minutes before I could get attention; 30 people were waiting on an average 32 minutes; and yet the United States Railroad Administration calls this economy!

Three years ago you could telephone and a ticket would be sent to you by a courteous messenger. The ticket agents, not only in the larger cities but in the smaller towns as well, vied with each other in securing business. Now, you wait to buy a ticket, you wait for belated trains and you take an upper, if you are lucky enough to get one. There is, however, one redeeming feature in this—it makes old men young, in that they have learned to climb down from an upper without disturbing the porter.

In the old days, the dining car conductor would ask you if your meals were satisfactory. Now, you take what you can get, and if it isn't satisfactory, you can leave it. In the old days, the train conductor was proud of his train, and would remark to his friends, "We will reach your town on time," or if they were a few minutes late, he would apologize for it and explain the reason. Now, they are indifferent. The whole service has gone to H—— along with individual initiative.

E. J. KNICKERBOCKER.

Army Supply Bases Useful Adjuncts to Railroads

The Facilities Made Necessary by the War Were Planned to Meet Peace Time Conditions

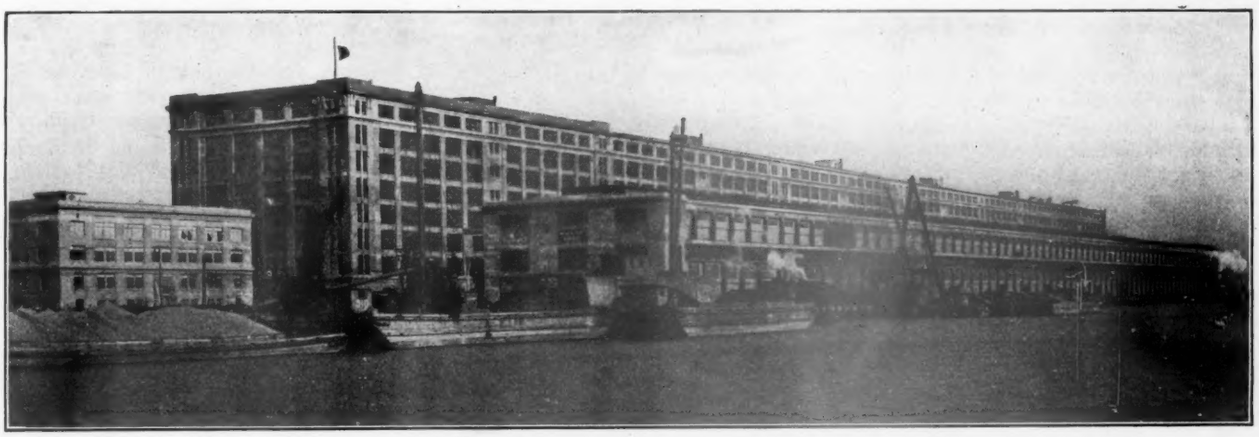
INCLUDED IN AN ENGINEERING PROGRAM, involving the expenditure of more than $1,200,000,000, embracing 581 major projects, located in 547 different and widely separated localities, handled by the construction division of the Army during the 18 months that this country was at war, was a comprehensive scheme for the development of port and terminal facilities sufficient for the storage and transshipment of supplies for the expeditionary forces. The plans provided for the construction of port terminals at Boston, Mass.; at Brooklyn, N. Y.; Port Newark, N. J.; Philadelphia, Pa.; Norfolk, Va.; Charleston, S. C., and New Orleans, La., and for interior warehouses at Chicago; Columbus, Ohio; Jefferson, Ind.; Pittsburgh, Pa.; New Cumberland, Pa.; Schenectady, N. Y., and St. Louis, Mo.

Each of the 14 layouts was planned and built as a complete project in itself and each one is a part of a co-ordinated plan designed to relieve the congestion of transportation facilities resulting from the convergence of overseas freight at the seaboard, largely at New York; to permit continuous operation of manufacturing plants in the interior; to ensure maximum utilization of cars and permit the diversion of freight from one port to another to meet the changing conditions.

The storage areas provided in the port terminals supply the reservoirs to care for the material received at the seaboard during the lapses that are bound to occur in the schedules of ships. They are necessary not only because of the fact that a ship cannot arrive, discharge its cargo, load and depart on a rigidly fixed schedule, but also because of the irregularity in the arrival of shipments from the interior. The storage areas or interior warehouses at the sources of supply permit the manufacturing plants in the interior to work at all times to their maximum capacity by providing the outlet for the finished products without excessive storage space at the plants. In connection with the port terminals they give the opportunity for loading the materials in car load and train load lots, permitting the maximum use of cars, helping largely to overcome the necessity for using cars for storehouse purposes. To ensure flexibility in the system and to permit the diversion of freight from one port to another as occasion demands, traffic routes from each of the interior warehouses to all of the port terminals were definitely worked out prior to the final decision as to locations.

In taking up the studies of the amount of space required at the port terminals and for the proper handling of freight in the interior, the amount of tonnage that had to be shipped abroad each month was first ascertained. From this was deducted the amount of space required at the ports to accommodate this volume of freight, the number of cars to be handled daily and the size of the yards necessary to handle these cars. In other words, the terminals were planned as a complete whole to meet certain definite conditions, with allowances for increased demands. They were built on vacant land, with room for expansion and with adequate space for yards and docks. In all, a total area of about 1,200 acres was required at the seaboard for the seven port terminals.

Generally speaking, two types each of port terminals and interior warehouses were built. In addition to the railroad facilities, the port terminals consist of one-story buildings for one type and multi-story for the other, the same general division of type holding for the interior warehouses.



Administration Building, Main Building, Wharf Shed, Boston Terminal

The Port Terminals

Port Newark terminal is a typical example of the one-story type port terminal. It is located on the Jersey marshes about three miles from the city of Newark. It fronts on a ship canal extending from Newark Bay and has a direct rail connection with the Central Railroad of New Jersey.

The storage plant consists of nine warehouses and two open sheds, all of the buildings being 161 ft. wide and 1,150 ft. long. The warehouses furnish a storage area of 1,750,000 sq. ft. and the sheds 300,000 sq. ft. All of the buildings were placed at right angles to the waterfront, where a dock 3,300 ft. long and 80 ft. wide is provided.

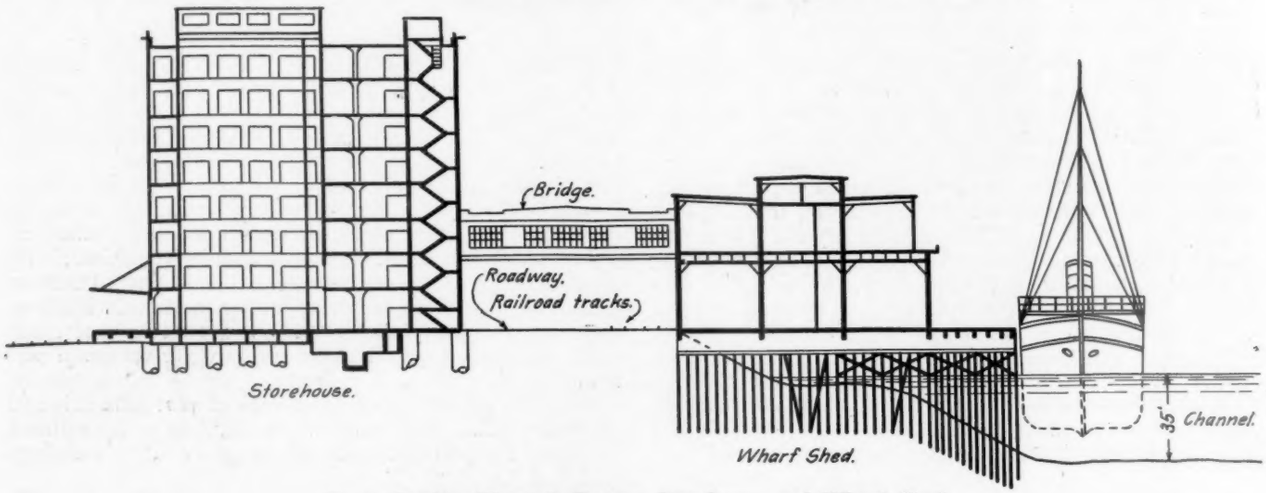
Each of the sheds and warehouses is provided with roadways on one side and with track facilities on the other. The arrangement of the roadways and tracks in reference to the buildings is shown on the general plan. It will be noted that the buildings are parallel to each other and separated by alternate roadways and railroad tracks. The warehouses are provided with platforms 18 ft. wide on both the track and roadway sides. At the open shed a platform also 18 ft. wide is provided on the track side. The roadways are 70 ft. wide and the tracks serving the platforms are spaced on 14

ft. centers with a distance from adjoining platforms to the center line of near track of 6 ft.

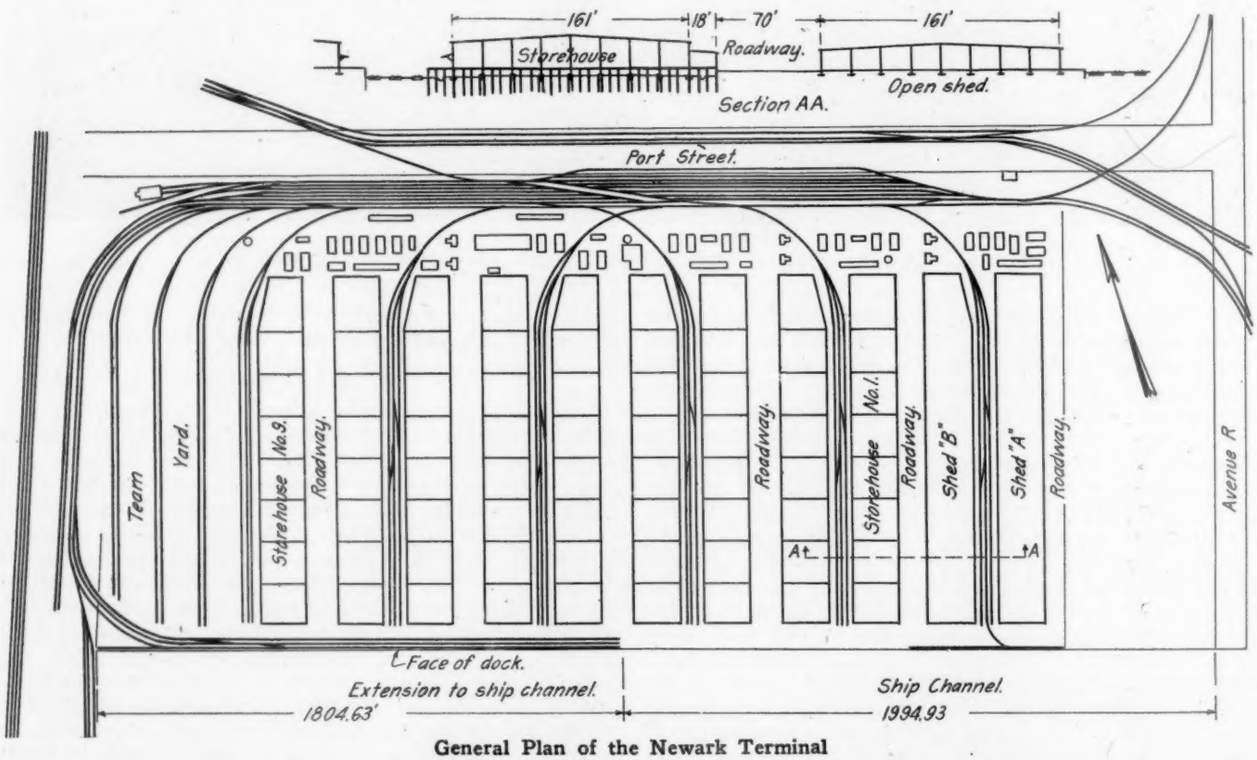
The warehouses are entirely on pile foundations and are all one story high with plank floor, 6-in. terra cotta block walls and mill construction roof, except one, which has brick walls. This was carried up over a part of its length to provide space for office use.

The construction involved 800,000 cu. yd. of hydraulic fill, 600,000 piles in the foundations, 28,000,000 ft. B. M. of lumber, 3,500,000 bricks, 400,000 sq. ft. of terra cotta and approximately 15 miles of railway tracks. During the construction, which was completed within three months, more than 10,000 men were employed at one time and 67 pile drivers and other equipment in proportion were used simultaneously in order to complete the project promptly in the face of the many difficulties arising from weather conditions.

One of the multi-story type port terminals was built at Boston, Mass. This plant includes the army supply base and two navy structures with their supplemental docks and wharfs, the whole comprising a project costing approximately $28,000,000, and covering 37 acres of land and 20 acres of water. The main building is an eight-story reinforced concrete warehouse of flat slab construction, with the first floor designed to carry 500 lb. per sq. ft. and the upper floors 300 lb. per sq. ft. and having an area of 126 ft. by 1,638 ft. The exterior is finished concrete. The first concrete was poured on May 14, 1918, and the last on October 3 of the same year. There are 4,000 lineal feet of wharfs and 2,860,700 sq. ft. of storage space in the eight-story building and the adjacent pier shed. A railroad supporting yard has



Cross Section Through Boston Storehouse and Wharf Shed



General Plan of the Newark Terminal

been built providing 11½ miles of single track, with a capacity for 722 cars and a terminal yard with 6½ miles of track, giving a total of permanent track of approximately 18 miles.

The project includes the main building 126 ft. by 1,638 ft. 8 stories high, the power house and coal crusher, 80 ft. by 85 ft. by 78 ft. high, the main building wharf shed 2 stories high, 100 ft. by 1,638 ft., and the navy pier sheds,

A View of the Interior Warehouse at Chicago

two 3-story buildings, each 100 ft. by 924 ft., a one-story and basement electric sub-station, 86 ft. by 52 ft., a 3-story and basement administration building, 122 ft. by 88 ft., designed for three additional stories, the west open wharf, 120 ft. by 1,100 ft., and the east open wharf, 72 ft. by 580 ft.

The principal items in the construction of this project include 2,500,000 cu. yd. of dredging, 13,000 tons of reinforcing steel, 300 tons of structural steel, 7 miles of sewer and water pipes laid, 30,000 wood piles, 6,650 lb. Raymond concrete piles, 240,000 cu. yds. of concrete, 5,700,000 sq. ft. of forms built and erected, 30 miles of temporary and permanent tracks and 265,000 sq. ft. of windows set and glazed. In carrying out this project 720 cars of material were received and unloaded. This plant fronts for its entire length on a channel leading from the main ship canal in Boston harbor with a second channel back of the pier shed. The general layout map shows its location in reference to the water facilities and the supporting yard facilities, the yard having direct rail connection with the New York, New Haven & Hartford Railroad.

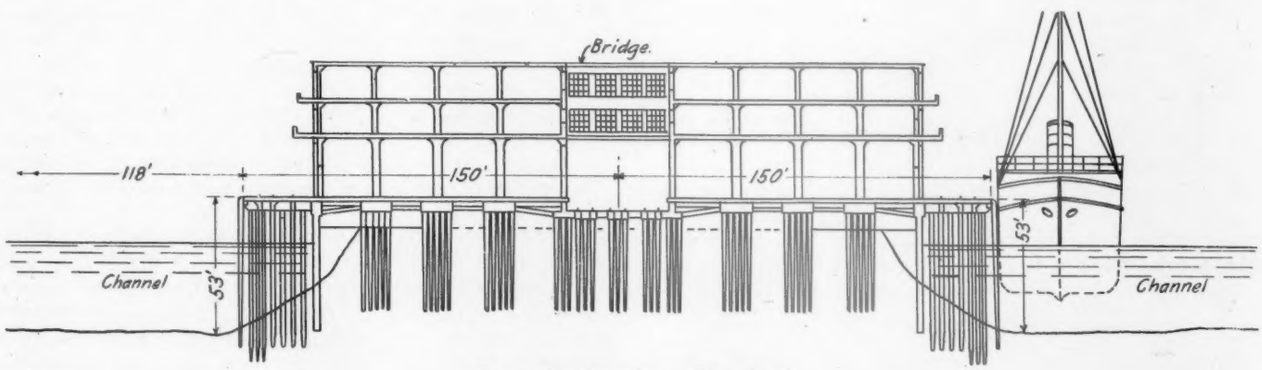
From north to south the service tracks include three tracks serving the storehouse on the north, two tracks between the storehouse and the wharf shed, and two tracks south of the wharf shed extending the full length of the pier. These are so arranged to permit freight to be unloaded simultaneously direct from the cars to ships, into the pier shed or wharf shed, or into the warehouse for storage or classification, from which it can later be moved to the piers by means of elevators and storage battery trucks.

The sections through the pier sheds and the storehouse and wharf shed show the provisions made for the convenient handling of stored material. Bridges are provided at both the upper floors of the pier sheds and between the second floors of the wharf shed and the storehouse.

The Interior Warehouses

The storage warehouse at Columbus, Ohio, including nine warehouses supplying a total floor area of 2,000,000 sq. ft. on a site, including 300 acres of land, is an example of the one-story type of interior warehouses. The warehouses are 160 ft. wide and 1,540 ft. long, and are all one story high except one, which provides office space on the second floor of 2,200 sq. ft. One building is the open type shed with frame roof and timber floor, the remaining eight being constructed with tile exterior walls, 16 ft. high, on concrete foundations, with roofs of mill type construction and concrete floors. These buildings are each divided by brick firewalls into 11 sections. The track sides of the buildings are provided with covered unloading platforms 12 ft. wide, running the full length. A classification and storage yard of 500 cars capacity and of 12 miles of tracks is provided, allowing 100 cars per day to be unloaded. Four and a half miles of concrete roads have been constructed as well as a complete sewer and water system. Electric power is provided for the operation of tiering machines and battery-charging equipment, the batteries being for the tractors, which are used to facilitate the operation of the plant.

View of the Tracks, Main Building, Wharf Sheds and the Connecting Bridges, Boston Terminal



Cross Section of the Pier Shed

The second type of interior warehouse is of multi-story reinforced concrete fireproof construction throughout. The St. Louis warehouse, a reinforced concrete skeleton structure veneered with brick, is an example of this type. It is designed in flat slab construction for a live load of 500 lb. per sq. ft., and is 100 ft. wide and 600 ft. long. The center section is

7 stories, including basement, and end sections are six stories.

The plans for these facilities were developed under the direction of Francis Lee Stuart as chairman of a sub-committee appointed by the War Industries Board. The construction was by the construction division of the Army.

Abatement of the Whistle Nuisance

At Tyrone, Pa., on the Middle Division of the Pennsylvania Railroad, conductors of passenger trains who have to call in a flagman do it by means of an electric bell which is fixed on a post several hundred feet back of the train and is controlled by a push button on the station platform. This simple arrangement for reducing the disturbance to the neighborhood by the noise of the locomotive whistle was put into effect on June 4, and it does away with a large amount of whistling, as most of the passenger trains stopping at Tyrone have large quantities of baggage and mail to discharge or to take on. The station at this place is situated on a curve, and a high bank on the inner side of the curve interferes with easy communication between the standing train and any flagman who may be back the regulation distance, or even a shorter distance. There has been considerable inconvenience by reason of flagmen not hearing the engine whistle, particularly when the sound of the whistle was partly drowned by the noise of a moving freight train. There are four main tracks on this part of the road.

Bells are provided only for the passenger tracks. Each bell circuit is arranged to ring two bells, one a short distance from the standing train and one farther back; and for each circuit there are two push buttons so as to make it easy for the conductor to reach one or the other without loss of time.

The conductor, in sounding the bell, gives the regulation number of sounds, as prescribed by rules 14d and 14e. It has been found that there is in every case a saving of some seconds of time as compared with having first to inform the engineman and then have the signal given by the whistle.

The whistling of the large number of trains that stop at Tyrone in the course of every 24 hours, must, of course, have been something of an annoyance to the people of Tyrone; but the officer of the road who gives us this information says that, so far as he knows, no protest had been made.

The bells are located as follows: westbound, track No. 3, at the east end of the platform and at 600 ft. farther east; for eastbound trains, track No. 2, at the west end of the platform and 600 ft. farther west. The platforms are about 1,000 ft. long. For a train of that length the farthest bell is only 600 ft. from the rear car; but the bell is loud enough to be heard a good distance, and the flagman can go as far as necessary to afford full protection to his train.

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Auto Railroad Car in Egypt

Train Accidents in May[1]

The following is a list of the most notable train accidents that occurred on the railways of the United States in the month of May, 1919:

Collisions

Date	Road	Place	Kind of accident	Kind of train	Kil'd	Inj'd
3.	Northern Pacific	....Forsythe	xc	P. & F.	0	2

Derailments

Date	Road	Place	Cause of derailment	Kind of train	Kil'd	Inj'd
2.	Seaboard A. L.	.....Wadesboro	malice	P.	2	8
8.	Balt. & Ohio	.....Pittsburgh	d. switch	F.	1	0
11.	Wabash	.....Moulton, Ia.	b. rail	F.	3	2
12.	Central of N. J.	.....Jersey City	unx	P.	1	2
21.	N. Y. N. H. & H.	....W. Mystic	b. rail	P.	0	2
21.	Mo. K. & Tex.	.....Alvarado	d. track	P.	0	3
23.	Texas & Pacific	.....Gordon	cow	P.	0	4
25.	Penn.	.....E. Palestine	boiler	F.	2	1
28.	Texas & Pacific	.....Marshall	ms	P.	0	16
†30.	Balt. & Ohio	.....Greenfield, O.	unx	P.	1	4

Other Accidents

Date	Road	Place	Cause of accident	Kind of train	Kil'd	Inj'd
13.	Seaboard A. L.	.....Method, N. C.	boiler	F.	3	0

The trains in collision at Forsythe, Mont., on the 3rd, about 1 a. m., were eastbound passenger No. 4 and a switching freight train, on a side track. The passenger train ran over a misplaced switch and into the switching engine, damaging both engines, two baggage cars and four freight cars. Two employees were injured. The yard train was switching on the main track without having protected against the passenger train, which was behind time.

The train derailed on the Seaboard Air Line at Wadesboro, N. C., on the 2d, was southbound passenger No. 13. The locomotive was overturned, and the engineman and fireman were killed. Six passengers and 2 trainmen were injured. The derailment was caused by a malicious obstruction.

The train derailed at Greenfield Avenue, Pittsburgh, Pa., on the 8th, was a westbound freight. The locomotive ran off the track at a defective switch and was overturned. T. W. Barrett, trainmaster of the Pittsburgh district, standing on the tender, was pinned under the wreck and was killed.

The train derailed near Moulton, Iowa, on the 11th, was through freight No. 95. One trainman and two trespassers were killed, and two trespassers were injured. The derailment was caused by a broken rail.

The train derailed on the 12th at Jersey City, N. J., was a local eastbound passenger. The locomotive was overturned, and four passenger cars were thrown off the rails. The engineman was killed and two other employees were injured. The train was nearing the terminal train shed, and was running at moderate speed.

The train derailed at West Mystic, Conn., on the 21st, was west bound passenger No. 5. The four leading cars in the train filled with mail and express matter were thrown off the track by a broken rail and fell down a bank. Two trainmen were slightly injured. The rail had been weakened by a transverse fissure.

The train derailed near Alvarado, Tex., on the 21st, was northbound passenger No. 28. Three passengers were slightly injured. The derailment was due to soft track, caused by very heavy rains.

The train derailed at Gordon, Tex., on the 23rd, was the westbound Sunshine Special. Three passengers and one trainman were injured. The train was thrown off the track by striking a cow.

The train derailed on the Pennsylvania Railroad near East Palestine, Ohio, on the 25th, was a westbound through freight. The locomotive, a new one, belonging to the Chi-

[1] Abbreviations and marks used in Accident List:
rc. Rear collision——bc, Butting collision——xc, Other collisions——b, Broken——d, Defective——unf, Unforeseen obstruction——unx, Unexplained——derail, Open derailing switch——ms, Misplaced switch——acc. obst., Accidental obstruction——malice, Malicious obstruction of track, etc.——boiler, Explosion of locomotive on road——fire, Cars burned while running——P. or Pass., Passenger train——F. or Ft., Freight train (including empty engines, work trains, etc.)——Asterisk, Wreck wholly or partly destroyed by fire——Dagger, One or more passengers killed.

cago, Burlington & Quincy, was wrecked by the explosion of its boiler, and two men were killed, the engineman of the train and a messenger for the Baldwin Locomotive Works. The fireman was seriously injured. Five cars were knocked off the track. The explosion was due to low water.

The train derailed near Marshall, Tex., on the morning of the 28th, was westbound passenger No. 25. The locomotive was derailed and overturned at a misplaced switch. The fireman and 17 passengers were injured.

The train derailed at Greenfield, Ohio, on the 30th, was westbound passenger No. 3. Four coaches were ditched. These cars were occupied by soldiers returning home to Arizona and New Mexico; one soldier was killed and four were injured.

The train involved in the accident at Method, N. C., on the 13th, was southbound freight No. 89. The locomotive, a new Mallet, was wrecked by the explosion of the boiler, and the engineman, fireman and one brakeman were killed. No cars were derailed.

Electric Car Accidents.—Of accidents to electric cars reported in the newspapers as occurring in the month of May, the only one thus far noted in which there was a fatality is that at Noblesville, Ind., on the night of the 24th, when a runaway car was derailed in the business part of the city, killing one person and injuring 23, and wrecking ten automobiles.

Canada.—Westbound passenger train No. 3, of the Wabash Railroad was derailed by the falling of a brakebeam near Cayuga, Ont., on the 8th, and the engineman and fireman were killed. Forty passengers were slightly injured. A derailment on the Grand Trunk near Paris Junction, on the 22nd, resulted in the destruction by fire of ten cars containing oil, gasoline, coke and other merchandise.

Country-Wide Safety-First

A. F. DUFFY, manager of the Safety Section, Division of Operation, United States Railroad Administration, has issued a bulletin giving in brief form the results of the "no-accident month" campaign in the Southwestern Region. Full reports are not yet in, but "splendid results have been shown." The Pyeatt Lines record a reduction of 71 per cent; the Edson Lines, 70 per cent; the Whitehead Lines, 64 per cent, and the Johnson Lines, 67 per cent. The first three lines mentioned above, so far, are the only ones that have placed expert and experienced inspectors in the field.

This was for the month of May. For the first three months of the year there were marked reductions in deaths and injuries to employees. Interesting information is given in the bulletin concerning other Regions. One small road in the Northwestern Region, in the month of March, reported none killed and none injured, as compared with four killed and 31 injured in March of last year. The Central of Georgia reports that the Candler Silver Trophy has been awarded to the Macon Division, which, under the supervision of Superintendent M. B. Smith, worked 665,139 man-hours during the first three months of 1919, with *four* injuries reportable. The Columbus shops, under Master Mechanic E. G. Gross, worked, during the three months, 333,452 man-hours, with *no* injuries reportable.

One large road in the Allegheny Region, in its report for April makes prominent the fact that 46 per cent of all bodily injuries and 37.5 per cent of all fatalities were those of persons who had been in the service less than one year. In the shops more than one-half of all injuries were sustained by men in the service less than one year, and the three men killed were all new employees. The proper education of new men is a serious duty. Another road shows that a large number of personal injuries happened to men in places not properly provided with artificial light. Keeping reflectors clean and having the upper part of the walls of shops properly whitened at all times, are important elements of safety. Keeping windows clean usually increases natural light 25 per cent.

Mr. Duffy calls attention to the fact that the Safety Section has been endorsed by the votes of the Grand Lodges of all the railroad brotherhoods.

A tabular statement showing totals in each of the seven regions shows on class I railroads for the month of March, 2,072 meetings of safety committees at which the aggregate attendance was 32,249. The record shows that at each of these meetings some officers or employees who ought to have attended were absent, and the aggregate absences for the month of March were 5,530, or about one-seventh of the total membership. About 100 safety rallies were held, at which were present 19,268 employees. The total number of employees killed on these roads in the month of March was 169, as compared with 264 in March, 1918.

The Reorganization of the American Railroad Association

AT A MEETING of the Executive Committee of the reorganized American Railroad Association, which was held in Atlantic City on Thursday of last week, the following officers for the ensuing year were elected:

President, R. H. Aishton, regional director, Northwestern Region.

R. H. Aishton
President, American Railroad Association

First vice-president, W. T. Tyler, director of the Division of Operation, United States Railroad Administration.

Second vice-president, E. H. Coapman, federal manager Southern Railroad.

General secretary and treasurer, J. E. Fairbanks.

Assistant general secretary and assistant treasurer, H. J. Forster.

General Secretary Fairbanks will in future have headquarters in both New York and Chicago. The offices of the association in Chicago will be located in the Manhattan Building. Activities of the mechanical, engineering, traffic and transportation sections will be carried on from Chicago. The treasurer will be located in New York and activities of the operating, telegraph and telephone, signal, transportation and purchases and stores sections will be carried on from New York.

The Executive Committee now comprises 20 members, including the directors of operation, of accounting and of capital expenditures of the Railroad Administration, the seven regional directors and the federal managers of seven individual roads. The meeting of the Executive Committee in Atlantic City was fully reported in the *Railway Age Daily*, edition of Friday, June 20, page 1579.

W. T. Tyler,
First Vice-President, American Railroad Association

E. H. Coapman,
Second Vice-President, American Railroad Association

Great quantities of perishable freight were delayed at inbound freight stations in New York City this week because of a strike of the teamsters, employed by the wholesale dealers and jobbers in fruit and fresh vegetables, said to number 3,700 men. As we go to press the merchants appear to be making no concession to the strikers, having employed some new men, and having made arrangements for police protection to prevent interference with their wagons and trucks. On Monday the number of carloads of produce waiting at the piers of the Erie Railroad, to be delivered to consignees, was reported as 35 of green fruit, 52 of melons, 64 of oranges and 1 of apples. At the Pennsylvania piers there were 35 cars of peaches, 5 of melons, 42 of cucumbers, 39 of tomatoes, 123 of potatoes, 12 of onions and 31 cars of miscellaneous vegetables. The Old Dominion Steamship Company, at its docks on the North river had 10,000 barrels of potatoes, 3,800 barrels of cucumbers, 1,100 barrels of cabbages, 550 crates of onions, 100 barrels of squash and 5,000 packages of beans. Very large losses by deterioration of the fruit and vegetables are sure to be sustained, and on Wednesday some of the merchants estimated the total as $1,000,000.

Orders of the Regional Directors

STANDARD STEAM HOSE COUPLING.—Order 213 of the Southwestern regional director states that an investigation of complaints received has developed the fact that some railroads were using a steam hose coupling of an entirely different type from that prescribed by the Master Car Builders' Association. A committee on standards has made an exhaustive investigation of steam hose couplings and it has been agreed that the standard steam hose coupling shall have M. C. B. contour and bore and a common standard gasket. The angle of the coupler shall be 20 deg. and the locking arrangement shall be similar to the type S-4 coupler, gasket to be made of composition and to be of the fixed type. The standard must be adhered to by all railroads under federal control where is is necessary to buy new couplings.

Sampling Grain in Transit.—Circular 220 of the Southwestern regional director quotes a recommendation of the Grain Dealers' National Association that grain doors of cars should have, at the top, boards not more than 6 in. wide, so that inspectors may inspect without destroying an unnecessary quantity of lumber.

Public Improvements; Special Assessments.—Circular 223 of the Southwestern regional director quotes the announcement of the Director General issued on June 2, relative to the method of handling public improvements or special assessments against railroads involving charges against capital account. This order supersedes all previous circulars and orders in this region concerning special improvement assessments and other charges against capital account based on public improvements under either special or general law.

The War Finance Corporation has announced the following new loans to railroad companies: Missouri, Kansas & Texas, $976,000; Pennsylvania, $12,260,000; Lehigh Valley, $800,000; Illinois Central, $1,500,000; Wabash, $92,800; Erie, $800,000; Seaboard Air Line, $135,000; Chicago & Alton, $80,000.

Executive Suggests Relieving I. C. C. of Power*

E. P. Ripley, President of the Santa Fe, Favors Appointment of a New Body to Control Railways

ONE OF THE MANY PROBLEMS that is troubling the American public today is service. There is trouble with service everywhere; there is trouble with service in the shop, in the factory, in the trades, in the club. The trouble everywhere is that there is practically no service, or that service is inefficient; that it is not half what it used to be. I think the real trouble is that there is no master. I think the work done under a master is always the best work. It is not derogatory to anybody to have a master. Every one interested in the accomplishments of any concern, whatever may be the business of such concern, is responsible to some one as a master. Everybody must account to somebody for his actions. Today we seem to have gotten away from that, to such an extent that every one is a law unto himself. To this extent we are Bolshevists, and are imitating Russia. It is this disorganization which accounts for the lack of service and the actual lack of production.

It is a matter of common knowledge that the railroads of this country were taken over by the United States Government on the first of January, 1918. There may or there may not have been good reasons for this. West of Chicago there was no good reason for doing so; there had been no failure on the part of the railroads to do their work and things were going on as well as always. East of Chicago there may have been good reason because of the tremendous—fictitious—impetus given to business by the war throughout the country generally. At the same time it was an open question whether, if the railroads had been allowed to throw aside all laws and had been permitted to do what the Administration did in throwing the laws of the country into the discard, and do things they had prohibited us from doing, the results would not have been equally satisfactory. It is not for me to say what the results have been so far as service to the public is concerned; that is something they may judge for themselves. Every one has had experience and can judge for himself. At all events it seems to have been borne in upon the Administration and upon Congress that the experiment of government operation has not been an unmitigated success.

I noticed that the bulletin board downstairs says "What shall we do with the Railroads?" I find it a good deal easier to criticize plans that have been suggested than to offer plans of my own. Almost everybody in Congress and I think almost everybody out of Congress has an idea as to the plan which should be operative. They all admit that the present condition can not go on any longer, but the plans for a solution range from the plan of Mr. Plumb, in behalf of the employees, who has a suggestion that the government buy the railroads and form a directorate of which the employees should be in the majority, to the plan of Mr. Warfield, representing the security holders, who practically does not want any limitations put on the earnings.

I do not think that Congress will ever pass any law which does not provide for some kind of regulation, there being apparently a fixed idea in the minds of some people that a curb must be put on the "rapacity" of the railroads. What opportunity the railroads have had to demonstrate the possession of this quality I am unable to remember. I can not remember when we were not very strictly limited in our income and more or less affected by law in our outgo.

The plan of Mr. Cummins provides for a small guaranty—he says from 4 per cent to 4½ per cent on the value. He is indefinite as to how he defines value. Presumably it is the valuation now going on under the auspices of the Interstate Commerce Commission, which is based primarily so far on the prices of 1914. It is a well known fact that the prices of 1914 are at least 40 per cent below those of today, and that 4½ per cent today is equivalent to about 2¼ per cent in the former purchasing power of money, so that with the short valuation and short income it does not leave very much for the widows, orphans, insurance companies, etc., who hold the securities, and bought them when a 4½ per cent return meant 4½ per cent.

The plan of Mr. Warfield also provides, not in fact although in theory, for a guaranty of earnings; that is, the Interstate Commerce Commission shall be in full charge of rates and practically everything, including wages; that the country shall be divided into regional groups, and that the rates in those groups shall be so fixed as to bring about a certain amount of revenue within those groups. This is a very devious and complicated method. I do not believe there is any possible way of providing a set of rates which will bring about such results without doing away with all uniformity and without bringing about the very discrimination which it is the desire of the country to avoid. I do not believe it is possible to make a series of rates to bring about a given result which will not result in somebody either getting too much money or too little, as the case may be. It will vary also from year to year. It seems to me the plan is objectionable in that regard. It is also objectionable in my mind because it still allows a control of railroads by the states that have heretofore bedeviled the situation in their own interests. If states like Texas, which undertakes to say "Texas for the Texans" and to build a Chinese wall so that no one else can do business there, can do this sort of thing it seems as though there ought to be some national body which could intervene. The same spirit has taken possession of some other states, but notably Texas.

Still a third plan, one which is presented by Congressman Esch of Wisconsin and Senator Pomerene of Ohio. This bill attempts to restore the railroads on the 1st of January next to their owners, but without any recommendations other than that it provides for a large extension of the powers of the Interstate Commerce Commission, and practically makes them the court of last resort. It provides that the Interstate Commerce Commission shall take care of all facilities, distribution of power, cars, etc.—practically take the management of the railroads out of the hands of the owners, but does not make them responsible for anything. In other words, it gives absolute power to that body without any responsibility whatever. Of course, the owners will not look with much equanimity upon that kind of a proposition. It is doubtful whether the owners of any property would like to see it taken away from them and transferred absolutely into the hands of any political body, and it is particularly objectionable, I think, because of the character of the Interstate Commerce Commission. And here I am going to say something that perhaps will not be altogether agreeable to everybody present and which possibly may result in a good deal of criticism so far as I am concerned. But I have arrived at a time of life when it is immaterial what anybody thinks about it and what anybody says about it, and if they desire to criticize they are quite welcome to do so.

The Interstate Commerce Commission has been in existence about 32 years and during that time has had many able members. It has also had many not so able and many who

*Address by E. P. Ripley before the City Club, Chicago, June 12, 1919.

were appointed because of political activities, or had made the railroad business their objective in the way of criticism. It is a singular thing, however, that in all of its 32 years of existence, it has never had as a member either a railroad man, or a business man, or a shipper, or a farmer. There was appointed on it a railroad conductor who had no previous knowledge of the railroad business except as a conductor. He has made one of the best commissioners they have had because he has done as well as he could with the education that he had. There are other members who have been partially educated at our expense. They were absolutely without experience. Many of them have learned that there are two sides to a question and have proved valuable to the Commission. There are still some others who have not seen the light. They are still standing in the way of compromise, or a fair way out of this muddle. It is only ten days ago that one of the members of the Commission said he did not think any remedial measures were necessary; the roads were earning as much money now as ever before, and all that was necessary was to return them to their owners without any legislation This ignores absolutely the fact that the dollar is worth only about sixty cents, and we have to pay our bills on the basis of the depreciated dollar. It also ignores the fact that there is some five hundred or six hundred millions more of investment upon which interest must be earned.

In the Western Advance case of 1910 I testified for the Western Lines that of all the disbursements of a railway company more than half the total goes into labor. I showed that in the current year the wages of Santa Fe employees had been increased about $2,000,000 and that further advances of $2,500,000 were in prospect. I made the argument that to meet such outlays it was absolutely necessary that we have more money. Like testimony was given by witnesses for the Eastern Lines. Nevertheless, the United States Government, through the Interstate Commerce Commission, refused to give us a dollar.

It has seemed to me just now, when presumably every member of Congress admits something ought to be done, whatever is done should be in the direction of rather more intelligent regulation for the railroads. We do not care, as middlemen, it does not make any difference to us, what wages are, if we can pass it on—if we do as merchants do, charge our customers enough so as to recoup us for what the government says we must pay, we can stand it. We are exactly in the same position as you merchants are.

We shall probably be obliged to take over the railroads not later than January 1st next, but we can not take them back under the conditions as they have existed heretofore. With the Interstate Commerce Commission regulations there must accompany more responsibility for the payment of our bills, which have been enormously increased by concessions to labor. It is a bad situation and I would be glad if anyone could show me a way out of it. It is much easier to criticise the plans of others than to make new plans for others to criticize, and the question is often asked me what I would do if I could do just as I liked. That is always embarrassing because I do not know to what length I would go if I could do as I liked. But it has seemed to me that while the Interstate Commerce Commission ought to be in charge of regulation it ought to be shorn of its functions of prosecutor, judge and jury. It ought not to be permitted to prosecute an individual railroad for some infraction of the law and at the same time pass on the guilt of such railroad and fix the penalty. It is a dangerous thing to do. There ought to be somebody to whom appeal may be had. My thought has been that while the Interstate Commerce Commission should perhaps exist as heretofore there ought to be a body of three or five people, appointed by the President and acting for the people of the United States, holding almost the same rank as judges of the Supreme Court, and receiving salaries that would make it an object for the best class of men, who should have absolute legal power over anything presented either by the railroads, or by the Commission, and to whom decisions of the Commission could be appealed either by shipper, or by railroad. A body like that ought to be appointed for at least ten years—15 years would be better in my opinion—and ought to be independent of politics and ought to be the final body to protect the American people from any injury that might be done by the railroads, and the railroads from the injury that has been done them heretofore and which may be done to them again by ill-considered partisan legislation. I have made no effort to introduce a plan of that kind except by correspondence with my friends and people in Washington, but hope that something of that sort can be done. I am sick and tired of perpetual lawsuits. We have been at law with the people of the United States for the last thirty years, it has not resulted in anything but bad feeling and there is no occasion for it and for its existence.

Mr. Sprague's Automatic-Stop Proposals*

THE PROPER FUNCTION of the automatic train control system is to control the train only when the engineman has failed to perform his required duties. The sense of responsibility for safety of their trains which is almost universally felt by enginemen is not always effective, with present safeguards, to prevent collisions. As I said when I was called to testify at the investigation of the South Byron collision, there has been a two years' attempt to introduce automatic train control on the New York Central. After a very considerable development the matter was called to the attention of the president of the road and he ordered a thorough investigation. This investigation was conducted in a perfunctory sort of fashion over a period of several months and was accompanied by two proposals to co-operatively equip the Hudson Division from Croton to Rensselaer.

Subsequently, by further direction of the president, the matter was referred to an expert committee, which was enlarged, by my request, so as to represent the entire New York Central Lines, this comprising the chief signal engineers of the four principal divisions, the chief mechanical engineer, the general superintendent of telegraph and the assistant terminal manager, aided, of course, by their experts.

This committee spent several months in their investigation, during which, in reply to many criticisms, constructive developments were made in the system; also new proposals were considered, covering shorter sections of line and reduced equipment of such character as would fully test the character and sufficiency of this system of train control, without involving too great capital risk.

A unanimous report was made endorsing a trial; but on the entrance of the United States into the world war, negotiations were suspended. Although I have seen this report I have never had a copy of it . . . .

* * *

Engineers and firemen are subject to the same frailties, weaknesses and accidents as others, and cannot control weather or other conditions external to their cabs. Momentary inattention, varying degrees of color blindness or defects in color sense, temporary or serious illness from whatever cause, fatigue due to long hours of service or to domestic demands, sleepiness induced by a torpid liver, the use of alcohol, the rhythmic action of the locomotive or the pressure of the wind may make the engineer momentarily oblivious to warnings. An unexpected happening in the cab, the break-

*Extracts from a statement by Frank J. Sprague before the New York State Public Service Commission, Second District, at New York City, June 18, 1919. (See *Railway Age*, June 20, page 1553.) Mr. Sprague is the inventor of multiple-unit train control and other important elements of the art of electric railroad operation.

ing of a water gage, distraction by the fireman or a transient cab passenger, a blow from a passing obstruction, the clouding and frosting of windows, inclement weather, with driving rain, hail, snow or fog, and drifting smoke from passing trains add equal dangers. Curvature of road and uncertainty as to headlands along the route, the glare of an approaching headlight, the possible obscuring of signals from other causes, the dimming or failure of signal lights, the clogging of signal blades in winter storms, or a momentary hiatus or aberration of mind,—all increase the possibility of failure of response to a correctly initiated or given signal, and emphasize the necessity of supplementing the sense of sight by those of hearing and touch.

* * *

How has the demand for the development of the automatic train control been met by the railroads? Often, although happily not always, by skepticism, disbelief and even narrow-minded opposition, at much of which I am not surprised and with a good deal of which I am in entire sympathy. I had some experience with one particular road, whose general manager and signal officer could never find an hour to inspect my system although one of its vice-president stated that if a system could be devised to increase safety of operation he believed, and would so advise his directors, that it must in law be adopted. And I may be pardoned if I take exception to the conclusion expressed, although I am not one of those who responded to a grandiloquent advertisement, issued after a series of disasters, offering the munificent prize of $10,000 to that inventor who would produce a satisfactory system of automatic train control. Those familiar with this development are aware of the great cost of such work, running in individual instances to hundreds of thousands of dollars. My own company and I, despite all the technical resources at our command, my own experience of 37 years in several epochal developments connected with the electric art and the association of men skilled in signaling and braking, have spent not only several years of effort but over $350,000 in cash.

Personally, I have not been satisfied to limit myself to "automatic stops." It has seemed to me that something much more was necessary, and that something was to marry together the wayside signal system of the road and the braking equipment of the train in such fashion that there should be repeated directly into the cab certain signals, depending upon the same track and train conditions as initiate the action of the wayside signals; and that in response thereto there should be be established in [the approach to] every signal block the potentiality of both service and emergency braking, with the absolute minimum of interference with the normal judgment and action of an engineer.

It must be admitted that the development of an automatic train control system to meet all conditions is no mean problem, and the opinion has been expressed that it would perhaps be best done by the railroads themselves, working, I assume, through their signal engineers and brake experts. To this point of view I wish to take exception, one which is no reflection upon the individual capacity or ability of the men referred to. Something more is needed than they can give, both in the matter of time and of constructive knowledge. The employees on a road are well occupied in maintaining in operative condition apparatus designed, built and installed by equipment companies, each especially familiar with, and naturally prejudiced in favor of, its particular devices. Something beside the criticism which railway operatives can give is essential, and that is an outside point of view, a constructive agency well equipped, technically and financially, with concentration of thought and aim undiverted by daily operative duties, which, selecting and clarifying the essentials which must characterize a system having common application, shall have the advantage of the critical constructive comment of those who must eventually use and depend upon the apparatus.

It is this combination of private amply-backed initiation, using not only the known facts with regard to signaling and braking but other knowledge in the industrial art, and close co-operation with the railways for a common end, which is needed; and if this latter is accorded, the financial backing will be forthcoming, and an eminently satisfactory result will obtain.

In my automatic train control equipment the electrical circuits are the acme of simplicity, compared to the circuits of signal systems; the track equipment is simpler and more reliable than the motor-operated wayside signal, although dependent upon the same initiating causes; the air equipment is similar to and in many respects simpler than the standard braking equipment; and in the end I believe that each and every part of it will be at least equally fool-proof. . . .

Contaminating a Water Supply by Storage Coal

A RECENT EXAMPLE of water supply contamination occurring at a small middle western engine terminal, emphasizes conspicuously an unexpected source of pollution possible in railroad water supply. The water at this point is drawn from two shallow, gravel type wells approximately 45 ft. deep and 400 ft. apart, and is pumped by vertical centrifugal pumps run by electric motors. The usual delivery rate varies between 125 and 200 gal. per minute per well, and the consumption averages 200,000 gal. per day. The wells are located about 1,000 ft. from the roundhouse. The yard is built mostly on a sand fill with a comparatively small amount of cinder ballast. The terminal is situated in a small river bottom, with the surrounding country fairly level, drainage facilities being poor.

In the early summer of 1918, in view of a prospective coal shortage, this terminal was designated as one of the points for storing a surplus coal supply. The coal was of the bituminous type common to certain middle western districts, and was unloaded in piles of approximately 400 tons. The maximum storage of about 30,000 tons was reached in December, the piles covering ground adjacent to yard tracks and between and beyond the locations of the wells.

Early in January it was noted that trouble was being reported with engine boilers, leaky flues and cracked staybolts developing to a considerable extent beyond what would be warranted by ordinary circumstances. Flues removed showed a very hard scale accumulation not in keeping with the usual conditions and pitting was noticeable. Samples of the water supply were forwarded to the chemist about the middle of January. The original quality of the water was not extremely bad, having tested 15 grains per gallon of scaling matter present, mostly calcium and magnesium carbonates. However, results of analyses of these new samples developed the fact that a considerable change had taken place, the carbonates having been reduced to 8 grains and the total hardness increased to 25 with an increase also in the sodium chloride content, this water being one which would form a very hard flint-like scale.

An investigation was started at once to ascertain the source of contamination. Samples of water were furnished regularly from both wells, and these showed not only a variation between each other, but also a fluctuation of total solids of between 20 and 60 grains per gallon. Samples from wells in the vicinity showed similar contamination within a radius of one-quarter mile, but in wells beyond there had been no change. This indicated strongly that local drainage was the conveyor of the pollution with the storage coal piles as the possible source, this being the only changed condition from previous years.

Samples of coal from the storage piles were sent to the

laboratory, together with samples from cars fresh from the mines. When part of these samples were digested in water at the laboratory, water drawn from the storage coal showed that the carbonates were entirely eliminated, leaving residual acidity and a strong increase in hardness. The fresh coal had but little effect upon the water even after 30 days' leaching. This indicates that the weathering had oxidized the iron pyrites in the stored coal with the subsequent liberation of the sulphuric anhydride, which was changed to sulphuric acid or incrusting sulphates and carried away by drainage or soaked into the ground.

Government analyses of coal from the mines have shown from 2.86 to 5 per cent sulphur. Check analyses of the coal from storage piles tested but 1.45 per cent sulphur, indicating that some possible 200 tons of sulphur, or around 160,000 lb. of sulphate compounds had been leached out of the coal to be carried away by drainage, either surface or sub-surface.

As a measure of relief the coal was cleaned up between the wells and also removed from a radius of 300 feet. This helped and the wells are now gradually returning to normal, although one appears to be more in the channel of the underground flow from the coal pile drainage and consistently shows a poorer quality than the other. It is still noted that after heavy rains the hardness of both wells increases considerably and from 3 to 10 days are required before a decrease is noticeable. It will undoubtedly be some time before the trouble is entirely removed, as white discoloration remains on the ground around coal piles similar to alkali deposits on the western plains.

As a means of permanent relief for locomotive boiler troubles, a complete water treating plant is contemplated at this point, as this will also give economical returns with the normal quality of the water. As a temporary expedient, predetermined amounts of soda ash are added directly to the engine boilers when they are washed, and also in tenders when they are filled.

This incident emphasizes the fact that local water conditions and drainage, including porosity of soil, should be given careful consideration in the storing of coal.

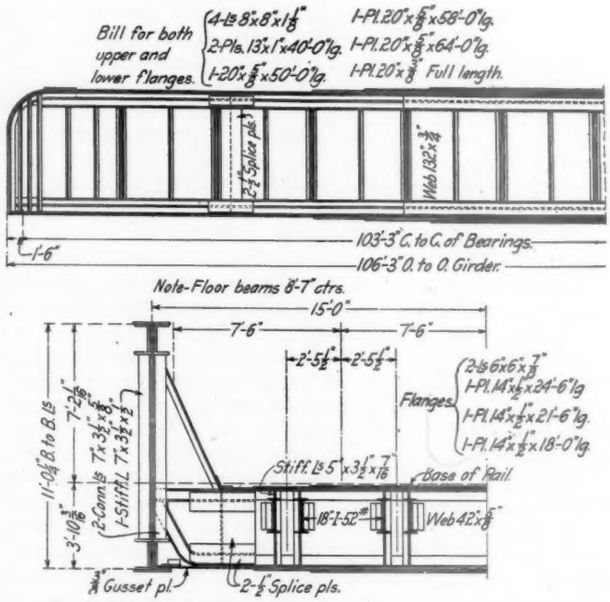
Big Four Increases Capacity at Congested Points*

THE structures formed an important feature of the Zionsville project, chief among them being the Eagle Creek bridge which is located about centrally in the long embankment. This is a reinforced concrete arch structure of the filled-spandrel type consisting of five semicircular arches —three central openings of 45 ft. with one at each end of 39 ft. The total length of the bridge is 273 ft. with a maximum height of 62½ ft. from base of rail to bottom of footing. It requires the placing of 6,200 cu. yd. of concrete and 112,000 lb. of reinforcing steel. Pile foundations were used.

The construction of this bridge followed modern practice in concrete work, handling material from cars to storage and from storage to the hoppers over the concrete mixer with a clam shell bucket and derrick, while using towers and spouting for transporting the concrete. Three fourths of a mile of temporary track was required to haul the material to the site of the bridge. Bulk cement was used, being delivered in open top cars covered with tarpaulin and unloaded with a clam shell bucket into a storage shed of 12 cars capacity. The filling and emptying of this shed by means of the bucket was facilitated by having the roof made with removable sections.

Other structures included two highway under crossings, a number of over crossings and several culverts. One of the undercrossings is on a skew of 29 deg. 9 min., necessitating an excessively long span in order to obtain the 24-ft. clear width at right angles to the highway. The superstructure of this consists of two through girders connected by a floor of 20-in. Bethlehem I-beams covered with concrete. Just south of the long cut is an embankment 500 ft. long and 30 ft. deep occupied by a reinforced concrete flat-top undercrossing 13 ft. 10 in. high and 24 ft. wide for a highway and a 12-ft. arch for a creek. As most of the overcrossings will be of concrete construction, it has been necessary to install temporary timber overcrossings at a number of places in the course of progress on the excavation of the cuts. The contractor for the grading on this project is the Dunn, McCarthy Company of Chicago. The construction of the heavy masonry work was let to the A. J. Yawger Company of Indianapolis.

Another double-track project in the vicinity of Indianapolis is the provision of second track between Briar and Beech Grove a distance of about five miles, double track having previously been completed in the five miles between Indianapolis and Beech Grove. The reason for this improvement, like that between Augusta and Whitestown, is the necessity



Details of Heavy Girder Span Used at Columbus

for a stretch of double track next to a large terminal. There is a large yard at Beech Grove, the work is all light involving embankments aggregating 50,000 cu. yd. and cuts of 25,000 cu. yd. The project is entirely complete except for the laying of track which has been delayed on acount of the inability to secure rail.

At Columbus, terminal facilities are being improved by the construction of a yard at Avenue, about four miles southwest of the city, in connection with provision for double track throughout the terminal district. The present project covers the second tracking of 4⅓ miles on the line toward Springfield and the construction of a part of the Avenue yard which eventually will be the main terminal for the Big Four at Columbus. An important feature of this work is the reconstruction of two bridges about one fourth mile apart, one over the Scioto river and the other over Olentangy creek. In making these renewals the grade was raised 2 ft. 4 in. at the Scioto river bridge and 0.9 ft. at the other structure.

Of special interest in connection with these structures is the use of long heavy through girder spans, one of 106 ft. 3 in. and three of 95 ft. 9 in. for the first named bridge and

*An illustrated article was published last week on this subject.

three 104 ft. 3 in. spans at the second bridge. The bridges are designed for E-70 loading, New York Central Lines specifications, so that with a double-track, through-girder span 106 ft. long, the construction becomes exceedingly heavy, the steel in this one span weighing 250 tons. As the old span arrangement was not maintained throughout in the reconstruction, the work included considerable substructure work beside that of extending the piers for second track. The second track work here entailed 11,900 cu. yd. of cut and 47,500 cu. yd. of fill while the yard work, to the extent to which it is being constructed at the present, involves a cut containing 71,000 cu. yd.

All of the improvement work on the Cleveland, Cincinnati, Chicago & St. Louis has been conducted under the general direction of C. A. Paquette, chief engineer, Cincinnati, Ohio. The work on the Indianapolis-Cleveland line and at Columbus has been under the direction of W. C. Kegler, district engineer at Galion, Ohio, and W. S. Burnett, district engineer at Springfield, Ohio, (during the illness of Mr. Kegler). The work at Indianapolis has been under the direction of A. M. Turner, district engineer, Indianapolis, Ind. Resident engineers on this work are W. T. Taylor, Zionsville, Ind., T. E. Earle, Union City, Ohio, and F. N. Johnson, Bellefontaine, Ohio.

Russia as a Field for American Railway Genius

Foreign Assistance Necessary in Rehabilitation and Extension of Transportation Facilities

By A. A. Boublikoff*
President, Atchinsk-Minoussinsk Railroad

THE FUNDAMENTAL CAUSE of Russia's economic weakness was the retarded development of her railway system. This was among the primary causes, if not the only cause, of her complete political, military and economic collapse.

From the very beginning of her railroad construction, the development of the Russian railroad system was constantly behind the increase of the country's productiveness. If we plot the curve of the increase of railroad mileage in Russia, together with the curve of the traffic density for the period of time from 1874, when the necessary statistical data first became available, until 1904, a remarkable phenomenon would become apparent; namely, the two curves will be almost mathematically parallel. Even war-times and bad crops failed to produce serious and lasting fluctuations in the curve of traffic density.

Let the aggregate mileage of Russian railroads in 1874 be 1. Then the mileage in 1884, 1894 and 1904 will be 1.5, 2 and 3, respectively. The traffic density, however, would also increase 1.5, 2 and 3 times for the respective years. It follows that the sum total of traffic carried by the railroads, the amount of ton-miles, increased directly as the square of the growth of the roads, or 2.25, 4 and 9 times for the respective years. Consequently it may be asserted categorically that during the 30 years from 1874 to 1904 the productivity of Russia was steadily and energetically eclipsing the growth of the railroads.

The Russo-Japanese war and the first Russian revolution caused in 1906 a respectively sharp downward turn in the curve of traffic density, but the effect of even these tremendous events was nowise lasting and as early as 1907-1908 the previously stated relation between the curve of mileage and of traffic density prevailed again. In the years following, up to the outbreak of the great European war, the curve of traffic density soared even high above that of mileage.

On the eve of the great war the average traffic density on the Russian roads, two-thirds of which are single-tracked, reached 1,200,000 ton-miles per mile. Russia had no rivals so far as the work done on each individual track is concerned. If a railroad, as a mechanism, had no limit of power and if furthermore, there was no limit of economically profitable loading,† the facts stated above would have insured the Russian railroads the largest income in the world.

In reality a large number of Russian railroads exceeded the limit of profitable loading, so that further increase in tonnage carried, instead of increasing the net profit, brought about, on the contrary, an enormous growth of costs and losses of operation. Moreover, a sharp divergence between the demand for freight traffic and the available means for meeting this demand became prominent. The freight capacity of many lines became utterly exhausted at length. As a result, it became practically necessary to renounce the principle of shortest distances‡ and to use on a large scale the so-called "circuits," *i. e.*, roundabout routes for shipments to avoid congested sections. The additional mileage necessary in this way, as against the shortest distance method, often amounts to as much as 400 versts (about 267 miles) and more. It not infrequently happened, however, that all possible circuitous routes were also completely clogged. In such an event, freight traffic for many routes would practically come to a standstill. The railroads, instead of stimulating the productive forces of the country, would instead become a drag on its economic development.

The war further revealed the fatal weakness of the Russian railroads. Not only did they prove unable to handle the volume of freight traffic swollen by military needs, thus causing a lasting economic crisis, but they also fell down in their share in the military defense of the country.

Weakness of the Railroad System

It is hardly necessary to demonstrate elaborately the essential and intimate connection between the destinies of the

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†Most of the Russian single-track railroads have a theoretical road capacity of 20-21 pairs of trains per 24 hours. Not a few lines actually despatch this number of trains part of the time, so their yearly average reaches 17-18 pairs of trains per 24 hours. In individual cases Russian railroads develop a truly enormous road capacity. Thus, for instance, 7,000,000 tons of freight in addition to a lively passenger traffic passed over the single-track railroad running across the Dnieper bridge in Ekaterinoslav. This meant the passage of 96 trains a day on one track! The Kharkov-Penza line was at one time so congested that for the construction of the second track it was necessary to rely upon horse carts for the supply of rails and ties. Experience has taught, however, that so intense a use of road capacity is accompanied by an incredible decrease in the speed of freight movement. Thus, for example, on some sections in the Donetz region the average speed at times fell to 6 versts (4 miles) per hour and lower, as against the general average on the Russian lines of 11 versts (about 7 miles) per hour. This naturally leads to a big increase in cost of operation. It sometimes happens that an addition to the tonnage earned by a railroad decreases rather than increases the net profit. It has been found that the limit of profitable loading for a single-track railroad in Russia is 12-13 pairs of trains, which is also the number normal for American railroads.

‡It is noteworthy that in 1888, when the Russian Government undertook to regulate freight rates, one of the first steps taken was to introduce this principle and forbid competitive transportation along circuitous routes. This was also one of the first measures adopted by Mr. McAdoo's administration.

Russian railroads and the general trend of state policy in Russia. From times immemorial a police state (Polizei-Staat) has been the ideal of Russian statesmanship. The heavy arm of the state power has been laid on every manifestation of the life of the people. To this is due, it may be said in passing, the fierce reaction against state authority sweeping Russia at present.

Naturally a vast phase of economic activity, such as railroad construction, could not but come under the controlling power of state authorities. From the start railroads were constructed in Russia either by the direct order of the government or with its active financial assistance. The system of guaranteeing a net return on capital invested in private railroads—usually 4½ or 5 per cent on both bonds and stocks—was applied extensively. However, in view of the facts that enormous funds were usually misappropriated during the construction and that the amount of traffic was very small in the beginning, the newly built lines produced no net revenue at all and almost the whole burden of paying the interest on the "private" capital invested fell on the state treasurer. The result was that in Russia the control of the railroads was simultaneously vested in two agencies: the Ministry of Ways of Communication and the Ministry of Finances. The whole history of the railroads in Russia bears the imprints of the ceaseless struggle between these two institutions. Except during a few brief intervals, the Ministry of Finances, systematically and persistently championed private railroad construction, while the Ministry of Ways of Communication with equal zeal advocated state ownership of railroads.

The practical outcome of this conflict was an extraordinary systematic obstruction of railroad construction, without precedent in the history of any country, and extreme fortuitousness in the choice of lines to be built. Despite the energy of the entrepreneurs, their influence with politicians, their extensive and unscrupulous methods of bribery and "promissory" notes, the realization of projects of new railroads were delayed for decades, while, at the same time, railroads of doubtful utility would suddenly be started simply because the Ministry of Finances chanced to find means to finance the enterprise.

As a result, the Russian railroad scheme lacks system. Many accidental circumstances during construction caused transit distances to be longer than required by actual topographical conditions. Consequently, freight travels many unnecessary miles. For example, the distance between Odessa and Kiev, two very important centers, is 480 versts (320 miles) as the crow flies, whereas the railroad connection is 612 versts (408 miles), an excess mileage amounting to 28 per cent.*

Most of the through trunk lines are made up of separate feeders widely differing in their transversal sections. Many active trunk lines consist of sections with grades of .6, .8, 1.0 and 1.1 per cent. Since Russian locomotives are chiefly of one type this necessitates constant reforming of trains which means an enormous increase in the cost of operation. It often happens that while a new line is being constructed, the capacity of an old line which is to forward freight from the new road is not sufficiently increased, thus rendering the full utilization of the new line impossible. Especially backward was the development of junctions. Generally speaking the Russian railroads have never been a unified mechanism, with co-ordinate parts.

Completely clogged railroad sections adjacent to lines with ample unutilized traffic capacity were an everyday occurrence. The formation in the stations of enormous stores of grain during the realization of the crop was a regular event every year. The accumulation of mined products was prevented by artificially adjusting the output of the mines and mills to the capacity of railroads, by so-called "plans of transportation." All these circumstances taken together caused periodical financial crises in the Russian railroad business and constantly tended to lower the profits of the owners of the roads. . . .

Russia is the exact opposite of those countries which have more railroads than their economic development requires. As new lines are constructed in such countries the average traffic density of the railway system as a whole falls. Such, for instance, is the case of Argentina. Russia is, therefore, a vast field for intensive railway construction. There is not the slightest danger that Russia will be provided in the near future with a railroad mileage unwarranted by the productivity of the land and that the railroad business in Russia will thus become unprofitable.

Extent of Future Railway Construction

Here are the facts from which a notion may be derived of the amount of work to be undertaken for the purpose of providing Russia with the system of railways she needs.

As has already been mentioned, Russian railroads developed accidentally, by fits and starts. In view of this circumstance, it was repeatedly proposed to draw up an inventory, so to speak, of the railroad needs throughout the country and to elaborate a detailed "Plan for the Development of the Russian Railway Net." . . . Only as late as 1916, however, was there finally formed a special inter-departmental commission, which drew up a detailed plan for railroad construction after the war. It also projected a list of lines, whose capacity to yield profit was beyond question and whose necessity for the state was incontestable. The list of these "first-class" lines included 35,000 versts (23,333 miles) of railroad.

These projected lines, almost without exception, were intended to meet the internal transportation needs of the country and did not solve the problem of opening up new and independent avenues of communication with the world markets. In the meantime the war and especially the Brest-Litovsk treaty have clearly shown that the sea outlets which Russia has at her disposal at present are not only insufficient commercially, but also fail to safeguard her freedom of political action. Thus, the creation of new outlets, more or less secure against German military and political aggression, has become a matter of vital importance. The following lines will meet this newly arisen need: the Caucasus-Persia, terminating at Bender-Abbas; the Turkestan-India, via Afghanistan; the Central Siberia-Peking, via Mongolia; the Amur Railway-City of Nikolayevsk-on-Amur, and two or three lines in the north of European Russia, terminating at Archangel and on the Murman coast. (The latter were included in the program because of their importance for the development of the exploitation of Russia's northern forests.)

Most of these lines were not covered by the official construction plans. They form an aggregate of 10,000 versts (6,667 miles) which must be added to the 35,000 versts (23,333 miles) of the governmental program.

Thus, Russia's immediate crying need for new railways amounts to a mileage of approximately 30,000 miles. But among the projected railroads which in the above-mentioned plan were set aside as secondary in value and profitableness, are a great many lines which, under conditions different from those now obtaining in Russia, would certainly be classed with the lines whose construction was recognized a matter of urgent national necessity and soundest investment. The mileage of such railways amounts to approximately 16,000 miles.

It is clear that Russia alone, in her present state of complete financial collapse, will not be able to achieve this colossal task without the assistance of Allied capital and

*The greatest Russian freight railroad east of Yekaterinoslav running to the Donetz Basin and carrying as many as 7,000,000 tons per mile a year, has in one section an unnecessary mileage of 20 per cent. In addition it has three entirely unnecessary gradients many hundreds of meters high.

Allied energy. Leaving aside the political conditions necessary for the work of this capital in Russia, it must be pointed out that the Allied nations, which in consequence of the war will have a number of domestic problems to solve, could only undertake such a vast investment of their treasure if Russia's reconstruction is considered in the light of its political significance and its magnificent economic potentialities. In this connection, it appears to be a generally accepted truth that universal peace and the prosperity of the peoples of the world demand the creation of a powerful Russian state which would be able to resist the economic and political aggression of Germany. Thus, from this standpoint, the necessity for Allied co-operation in rehabilitating Russia apparently needs no demonstration.

The economic possibility of this co-operation is still largely a debatable matter. The essential natural resources of European Russia fall into four groups: (1) Forests in the north, (2) peat in the northern and central sections, (3) anthracite in the Donetz basin, (4) mineral oil (naphtha) in the Caucasus and partly on the northern littoral of the Caspian Sea. If we further take into consideration that the deposits of bituminous coal in European Russia are altogether negligible, and that equally small are the deposits of rich iron ores in the Donetz basin, while on the European side of the Urals there is but one truly enormous bed of iron ores (the Komarov bed); we shall come to the conclusion that European Russia does not possess the necessary natural resources for such a broad, purely "American," economic development as will assure Russia's economic power and independence from Germany. With respect to its natural wealth, especially as regards that part of it which still lies hidden and unexploited, European Russia can by no means compare to a country like the United States, for instance.

The sources of the economic power of Russia, as a whole, must be sought not in its European portion, but in Siberia and central Asia. It is here that the potentialities of economic development are truly boundless. The country has practically inexhaustible deposits of mineral fuel of the highest qualities and possesses vast layers of gold and other precious minerals. It is stocked with rich metal ores to an extent exceeding all the other countries of the world. There are vast forests, endless stretches of most fertile alluvial soils (loess), which, when properly irrigated, would supply the whole world with cotton, and boundless meadows fit for the most intensive breeding of cattle. Siberia is that part of Russia in which the foundation for her economic strength can and must be laid. . . .

An Assured Market for American Industry

The world war has given a powerful impetus to American industry. The number of new factories and mills called into being in the United States by the needs of the war is enormous. When the war is over many of them will die a natural death, but a great many of them will have to be only slightly reorganized to continue their work along peace lines. . . . The natural tendency of American industry to maintain the war level of exports, if not to increase them, will meet with a systematic and persistent resistance on the part of both present foes and friends, especially of those of them who are able not only to meet their internal demand but also to offer their goods on the world market, *i. e.*, those who while seeking to develop their national industry have the necessary means therefor.

The only truly accessible market for the products of American industry are those countries which are unable to meet their own internal needs and in which the development of internal productivity is hindered by insurmountable financial difficulties. Only such countries can be truly willing buyers of the products of American industry. America will merely have to finance the buying needs of these countries.

The largest of these countries is Russia. Her need for the products of American industry is enormous. The size of this market, especially in Siberia, is so large that it will easily absorb a considerable part of American exports. It only remains to finance this consumption capacity. The best and soundest method of financing would be for America to take over various industrial concessions in Russia, especially railroad, forest and land concessions, which would be an excellent security for the capital loaned by America to the Russian consumer to enable him to buy the products of American industry.

Thus, in this matter, the interests of America and Russia are in complete harmony. America needs the Russian market for her capital and for the products of her industry fully as much as Russia stands in need of the products of American industry and of American capital for the development of her natural resources. Co-operation in this field can and will be obtained.

America's Political Interest in Russian Railroad Construction

There is, however, one circumstance, called into being by the war, which makes the achievement of this co-operation a matter of especially urgent necessity for America. . . . In the course of decades, the business of managing the industry of transportation by rail evolved a great group of prominent railway men who combine an immense amount of energy, knowledge and practical skill with wide financial and business connections. At present, a high sentiment of patriotism compels all these men to keep at their posts during the war. But when the war will be over there will be nothing to force them to act in the capacity of state officials in the business they had created and owned. Very many of them, and the best workers at that, are constitutionally, so to speak, incapable of adjusting themselves to the new situation, for the psychology of an owner differs too widely from that of a state official. Consequently it is permissible to expect that upon the expiration of the twenty-first month after the war there will arise a violent political struggle around the question of whether state or private ownership of the railroads should prevail. There is no doubt but that in this struggle all the best railroad experts will not be in favor of the historically inevitable transition of the railroads from private to state ownership.

This struggle cannot fail to arouse a violent commotion in the whole economic life of the United States,* a commotion which, judging from the example of other countries, can only be avoided by draining off, so to speak, the energy of these railroad experts and directing into channels, in other countries, of work the men are accustomed to. In this respect, America's undertaking to provide Russia with the railways she needs is of the highest internal value for the United States. If the industrial capital and energy, now engaged in the railroad business within the United States, will find a natural outlet in similar work in Russia, especially in Siberia, the problem of America's transition to State owned railroads may lose most if not all of its acuteness.

American leadership in Russian railroad construction will have highly beneficial consequences in many other respects. American capital will find a sound investment, American industry a reliable consumer, and America, as a body politic, will have a mighty buffer State against German or any other aggression in the East.

All these considerations taken together dictate the necessity of organizing, at the earliest possible moment, Russian-American co-operation in the field of Russian railroad con-

*That this will happen just so is best shown by the example of Russia, where the power of the government was so overwhelming that even experiments such as the introduction of liquor monopoly were accepted without a murmur. But even in Russia the taking over of the railroads by the government was accompanied by a struggle which agitated the whole society. In France and Italy the struggle around the railroad problem may be compared, for its intensity, perhaps only to the struggle against clericalism.

struction. The first step in this direction, it seems to us, would be the organization of something like an association of American railroad leaders, which should immediately commence to study Russia's needs for new railways, needs which, unfortunately, are entirely unknown here. This body should also elaborate the conditions on which American capitalists would be willing to invest their funds in Russia and draw up a program of financial and technical action. An individual person would hardly be equal to such a task. Without it the attempt of American railroad men to start work in Russia would, no doubt, meet with serious obstacles and unnecessary disappointments, and the work itself would not assume the dimensions corresponding to the magnitude of the problem.

The slightest delay in the work of the preliminary study of the problem will undoubtedly lead to results hardly desirable for America. As a matter of fact, Russia's need of individual railway lines was highly imperative even before the war, and, no doubt, as soon as order is restored in Russia her government will take all the necessary measures to inaugurate, at the earliest possible time, the construction of those most urgently necessary and, consequently, most profitable railways. Russia in that case will have the choice of many newly developed money markets. Some of them, for instance the Scandinavian market, have already become interested in Russian railroad construction. At the first signs of order in Russia they will make haste to take possession of the selected and partly investigated lines. Therefore, if America proves tardy, she may have to content herself with the less necessary and, consequently, less profitable lines.

We may have here a repetition of the recent story of the Russian banks; the absence of resolute action on the part of America resulted in that two banks (the Azov-Don and the Yunker Bank) are already in German hands, while the Siberian Bank is in the hands of English capitalists. It is more than probable that a similar fate will befall all the remaining Russian banks.*

This circumstance represents the greatest menace to all future American industrial work in Russia. It is particularly a menace to American action in the field of railroad construction.

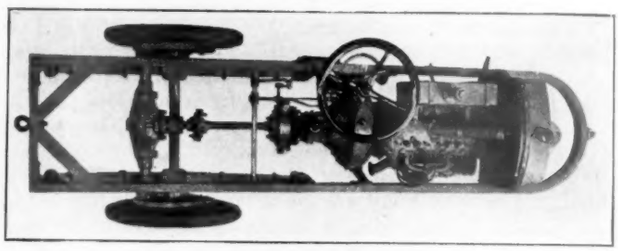
As a matter of fact, the majority holdings of the stock of the private railroad companies existing at present in Russia are in the hands of the banks. If the Germans are going to own the Russian banks, they will also, at the same stroke, become the owners of the now existing private railroads. It is a matter of common knowledge that the construction of new railway lines generally increases the revenue yielded by the old lines. Consequently, when, in compliance with the demands of international economic politics, the United States will begin to construct new railway lines in Russia, it may happen, if the Americans are not prompt enough, that they may have to work in the interest of the German capital owning the present Russian railroad system. This consideration is an additional argument in favor of recognizing as soon as possible the inevitability of Russian-American cooperation in Russian railway construction and of taking immediately the various preliminary steps and measures in this direction.

The War Finance Corporation has announced a loan of $392,000 to the Alabama Great Southern and one of $194,350 to the Cincinnati, New Orleans & Texas Pacific, both on the security of certificates of indebtedness issued by the Director General of Railroads.

*When the Bolsheviki, having discovered by experience what an incredible confusion their celebrated nationalization of the banks had introduced into the economic life of the country, unanimously decided to denationalize them, Count von Mirbach decidedly forbade them to do so. He did not conceal his motives: all Russian banks were not bought up yet by Germans!

A Gas Driven Industrial Truck

A RECENT DEVELOPMENT in industrial haulage is the use of gas driven vehicles modeled after the cars for street service, but adapted to indoor as well as outdoor use and designed for both direct haulage and tractor service. One example of this type of equipment, which has been in general service for some time, and is now being subjected to experimental use in several railroad freight houses, is of particular interest because of several characteristics which are such as to point towards some rather marked departures in the development of industrial truck service. Incidentally, the truck has several features of design that are in themselves unusual. For instance, it has three wheels rather than four

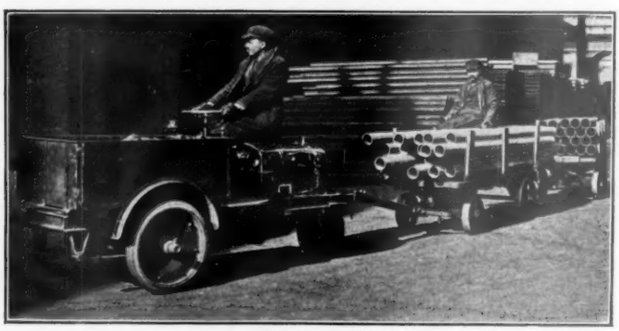


Chassis of the Tractor-truck

and is run backward, that is, with the two drive wheels ahead and the steering wheel in the rear.

The general makeup of the frame, power plant and transmission follow closely the standard layout of modern gas motor vehicles. This is illustrated by the photograph showing a top view of the machine with the body and hood removed. The engine is of 25-hp., four-cycle, four-cylinder (3⅛ in. by 4½ in.) type with a multiple disk, dry plate clutch, a selective type transmission with three speeds forward and one-speed reverse, and an internal-gear drive axle. The machine is equipped with cast steel wheels ordinarily provided with rubber tires, but which may be fitted with steel tractor rims so that the car may be used on rough ground.

The machine may be had with a plain platform, a fixed



The Truck in Tractor Service

rectangular box, a dumping box or a side dumping hopper, depending upon the service in which it is to be used. The fixed box body is commonly supplied where the car is used in tractor service with the idea of loading this box with whatever weight is necessary to obtain tractive power to meet the needs of the traffic in which it is to be used. A better idea of this is obtained from the fact that the weight of the car empty is 2,050 lb. while the capacity load which is placed directly over the driving wheels is 3,000 lb. The cars are said to run at speeds varying from ¼ mile to 15 miles an hour, giving great latitude in adapting the machine to various classes of service. For instance, the trucks have been used as the motive power for moving or spotting freight cars on

industrial side tracks. The practice of running the car with the driving wheels forward is said to be of considerable advantage in climbing inclines. Another feature to which attention is called is a three-gallon capacity welded gasoline tank, this capacity being enough for the operation of the car in ordinary service for an entire working day without recharging.

The small turning radius of 72 in. is of particular advantage in handling the car in close quarters. Other dimensions of the truck are: length over all 112 in., width 42 in., wheel base 72 in., tread 35½ in. This car is known as the Clark Tructractor, and is manufactured by the Clark Tructractor Company, Chicago.

Doings of the United States Railroad Administration

The Operating Statistics Section Reports Show That Economies Are Being Made in Train and Locomotive Service

WASHINGTON, D. C.

THE Fuel Conservation Section has issued a bulletin on locomotive fuel performance for January, February and March, 1919, as compared with the same period of the previous year, which shows an estimated saving in coal consumption by using less coal per 1,000 gross ton miles, or per car mile, amounting to $11,263,774. This is based on incomplete returns covering 76 per cent of the total mileage. In determining the estimated total saving for all roads in a region it has been assumed that the average per cent of saving for the whole region is the same as the average per cent for the roads in that region for which complete information is available. The grand total saving for all regions has been taken as the sum of the regional totals. In freight train service the estimated saving for all roads is $7,773,170. The saving on the roads for which information is available was 12.3 per cent. In passenger service the saving is estimated at $3,530,604, or 12½ per cent. The average cost of coal per ton shows increases in the various regions, as follows: Eastern region, from $3.48 to $3.92; Allegheny region, from $2.92 to $3.00; Pocahontas region, from $2.55 to $2.67; Southern region, for $2.82 to $3.40; Northwestern region, from $3.58 to $3.91; Central Western region, from $3.07 to $3.55; Southwestern region, from $3.13 to $4.14; Grand total, all regions, from $3.16 to $3.57.

The total tons of coal consumed in the three months amounted to 26,191,000 as compared with 30,943,000 in the corresponding period of 1918, and the total cost of coal was $93,503,000 as compared with $97,541,000. In freight service the pounds of coal per 1,000 gross ton miles averaged 220 as compared with 243.7 in the corresponding period of 1918. This is a decrease of 9.7 per cent. In passenger train service the pounds of coal per passenger train car mile averaged 20 as compared with 22½ last year, a decrease of 11.1 per cent.

Operations of Federally Operated Roads for April

The Operating Statistics Section has published complete figures for April and four months ending April 30 for all the large railroads in federal operation. 231,691 miles of road are included out of a total of 239,997 actually federally operated, comprising 96 per cent of the mileage and 98 per cent of the revenues.

	Month of April		Increase or decrease	
	1919	1918	Amount	Per cent
Operating revenues	$384,739,685	$365,540,408	$19,199,277	5.3
Operating expenses	339,229,299	276,446,983	62,782,316	22.7
Net operating revenues	45,510,386	89,093,425	d43,583,039	....
Taxes, rents, etc.	18,195,988	17,691,325	504,663	....
Net federal income	27,314,398	71,402,100	d44,087,702	....
Operating ratio	88.2	75.6	12.6	....

Note: d—Decrease.

One-twelfth of the annual rental due the companies covered by the report amounts to $74,017,136, so that the net loss to the government for the month was $46,702,738 for these properties. The loss from operation of all properties federally operated during the month was approximately $58,000,000.

In making further comparisons with 1918, it should also be borne in mind that the increased wages for April, 1918, were not charged into operating expenses until subsequent months.

The results for the four months ended April 30, were as follows:

(Class I railroads in federal operation)

	Four months ended April 30		Increase or decrease	
	1919	1918	Amount	Per cent
Operating revenues	$1,494,695,291	$1,294,322,364	$200,372,927	15.5
Operating expenses	1,355,661,499	1,078,979,007	276,682,492	25.6
Net operating revenues	139,033,792	215,343,357	d76,309,565	....
Taxes, rents, etc.	65,837,406	65,765,103	72,303	....
Net federal income	73,196,386	149,578,254	d76,381,868	....
4/12 of annual rental	296,068,544	296,068,544	.....	....
Operating loss	222,872,158	146,490,290	76,381,868	....
Operating ratio	90.7	83.4	7.3	....

FREIGHT TRAFFIC MOVEMENT

(Class I railroads in federal operation)

	Four months ended April 30		Increase or decrease	
	1919	1918	Amount	Per cent
Net ton miles (thousands)	113,692,228	133,056,686	d19,364,458	d14.6
Loaded car miles (thousands)	4,076,985	4,634,874	d557,889	d12.0
Total car miles (thousands)	6 044,944	6,616,732	d571,788	d 8.6
Freight train miles (thousands)	175,921	208,854	d 32,933	d15.8
Car load (tons)	27.9	28.7	d 0.8	d 2.8
Per cent loaded to total car miles	67.4	70.0	d 2.6	d 3.7
Train load (tons)	646	637	9	1.4

d—Decrease.

Excursion Travel Not to Interfere With Troop Movement

As a result of correspondence with the Secretary of War regarding the demands upon railroad equipment caused by the very large return movement of troops during June and July, Director General Hines has ordered a notice posted in all railroad station waiting rooms stating that during June and July the return movement of our soldiers from overseas will be at its height and that during the last week of June and the first week of July passenger equipment must be provided at the Atlantic ports for the transportation of several hundred thousand soldiers. It is stated that it is the paramount duty of the Railroad Administration to provide adequate facilities for the safe, prompt and comfortable return of these men to their homes and that every effort will be made to perform this duty with the minimum of inconvenience to those who travel for business or pleasure, but until the troops have been moved, coaches and sleeping cars will be crowded and temporary discomforts will result. The Secretary of War in a letter to Mr. Hines asked that the use of equipment for recreation purposes might be limited to an absolute minimum. He said: "The splendid co-operation received from the railroads, both in the prompt despatch of the troops overseas and to date in handling the return move-

ment is greatly appreciated by the War Department and the magnitude of this undertaking is the admiration of all."

Mr. Hines in reply said that every provision will be made for providing the necessary equipment and that the co-operation received from the railroads in connection with the overseas and return movements will be continued.

Division of Accounting Collects Maintenance Data

The Division of Accounting has issued its Accounting Circular No. 101 calling for the information required for the purpose of ascertaining facts incident to maintenance, repair, renewal, retirement and depreciation of roadway and structures and the expenditures and charges therefor required to meet the provisions of section 5, relating to upkeep, of the standard agreement between the director general and the companies and for the purpose of recording upon the operating books of the federal administration the necessary accounting data in connection with upkeep. The federal auditors are directed to take immediate steps to prepare, record and report the data called for on six forms included in the circular, which has been in course of preparation for several months. It takes the place of Circular No. 28 issued by the Division of Operation in March, which was suspended because it involved such a burden of clerical work on the roads and because the furnishing of the information then called for would involve a duplication of the work which was to be called for by the accounting department. The circular issued by the Division of Operation was expected not only to provide the data necessary to ascertain whether the contract obligation as to upkeep was being complied with, but also to set the maintenance program for 1919. The latter question, however, has become involved in complications and has required further instructions.

A considerable portion of the data required by the accounting circular has been or will be reported to the Interstate Commerce Commission, and this will form the basis so far as applicable of the returns required by the circular. Five copies of each report are to be made, one for the director of accounting, one for the director of operation, two to be sent to the regional director, one of which is to be sent by him to the proper officer of the corporation, and one for the federal manager. Federal auditors are also directed to discontinue the use of all maintenance of way and structures operating reserve accounts which may have been created by charges to operating expenses subsequent to December 31, 1917. Reserves of this kind arising out of charges prior to January 1, 1918, are not authorized and must not be shown on federal books.

Form 1 of the reports required is an analysis of maintenance of way and structures expenses designed to show the comparison between the test and federal control periods.

Form 2 is a comparison of labor costs for the two periods for the purpose of obtaining the factors for equating the cost of labor.

Form 3 is for the comparative cost of selected items of maintenance materials designed for the purpose of obtaining the factors for equating the net material charges.

Form 4, a comparison of maintenance of way and structures expenses, is designed to show the total expenses for each year and for the entire test period, the average for such period, the equated average expenses for the test period, the total expenses for one year of federal control and the increase or decrease in maintenance expenses for the year as compared with equated average expenses for the test period.

Form 5 covers maintenance of way and structures expenses on account of fire damage, maintenance of additional property taken over and improvements during federal control and a final summary designed to show by comparison of costs, in case the property has been improved through maintenance, the increase in maintenance expenses, and in case the property has not been maintained to normal standard, the decrease in maintenance expenses.

Form 6, operating statistics, is to secure data which may indicate the comparative use of the railroad during the test and federal control periods.

Cost of Train and Locomotive Service

The total cost of train service, including locomotive service, shows a steady decrease as compared with preceding months, although increases as compared with last year, according to the monthly reports compiled by the Operating Statistics Section. For the month of April it was 112.7 cents per 1,000 gross ton miles, as compared with 119.5 in March and 126.5 in February. The cost of locomotive service per locomotive mile in April was 115.2 cents, as compared with 98.5 cents in April, 1918; 119.2 cents in March, 1919, and 120.7 cents in February. The cost of train service per train mile was 162.2 cents, as compared with 141.7 in April, 1918, 167.5 cents in March, 1919, and 169.3 cents in February, 1919. The increase in the cost of locomotive service in March this year over March last year was 17 per cent, and the increase in the cost of train service was 14.5 per cent. All items of cost show increases as compared with last year. The figures are reported by roads and by regions. The combined averages for all regions with the comparative figures for last year and March and February of this year, are as follows:

	April, 1919	April, 1918
Cost of locomotive service per locomotive mile	115.2	98.5
Locomotive repairs	39.4	30.6
Enginehouse expenses	9.6	6.8
Train enginemen	18.9	18.1
Locomotive fuel	43.6	40.2
Other locomotive supplies	3.7	2.8
Cost of train service per train mile	162.2	141.7
Locomotive repairs } Enginehouse expenses }	55.5	43.0
Locomotive fuel	49.4	46.2
Other locomotive supplies	4.2	3.3
Train enginemen	21.4	20.8
Trainmen	25.3	23.9
Train supplies and expenses	6.4	4.5

	April, 1919	March, 1919	February, 1919
Cost of train service per 1,000 gross ton miles	112.7	119.5	126.5
Locomotive repairs } Enginehouse expenses }	38.6	40.8	43.1
Locomotive fuel	34.3	37.5	40.3
Other locomotive supplies	2.9	3.1	3.4
Enginemen and trainmen	32.4	33.5	34.8
Train supplies and expenses	4.4	4.6	4.8

Contracts Executed

The Railroad Administration has executed co-operative short line contracts with the Midland & North Western and the Miami Mineral Belt railroads.

Accounting Circular No. 99

Under the present instructions net ton-miles are being computed from conductors' wheel reports, while the same information is also being compiled from waybills covering revenue and company freight.

This causes a duplication of work, which seems to be unnecessary, and it has been decided that satisfactory net-revenue ton-mile figures can be obtained in the following manner:

(1) Compile from the waybills or other accounting documents the net ton-miles for nonrevenue freight (company material).

(2) From the total net ton-miles, as determined from the conductor's wheel reports, deduct the nonrevenue net ton-miles ascertained as directed in paragraph 1, thus producing the net-revenue ton-miles.

Effective as to all ton-mile statistics prepared for June, 1919, and thereafter, all federally operated lines are to discontinue the compilation of net ton-miles from way-bills and adopt the method prescribed above, except in cases where special statistics required by any state should render it impossible.

It is recognized that the same relation between ton-miles and revenue may not exist under this plan, as resulted from the former practice of securing this data from waybills. It is stated, however, that tests have demonstrated that the result is sufficiently accurate for all practical purposes.

Weekly Traffic Report

According to a report on traffic conditions for the week ended June 16, the volume of both freight and passenger business throughout the country shows an improvement, although for the country as a whole it is still considerably below normal. The shipment of grain is on the increase, but there is ample railroad equipment to handle the traffic.

The loading of grain in the Northwestern region has been exceedingly heavy, almost double the movement for the same period last year. Grain loading in the Central Western region showed an increase of 54 per cent as compared with the same period last year. Since the opening of navigation, 23,700,000 bushels of grain have been moved from the head of the lakes to Buffalo, and the Food Administration expects to move 150,000,000 bushels by this water route.

The total revenue freight handled in the Central Western region during the week amounted to 169,215 cars, which is a decrease of 6 per cent as compared with the same week a year ago but an increase of 19,017 cars over the preceding week. Passenger travel in this region has been so heavy that it was necessary to rearrange a great many schedules, establishing additional sleeping car routes as well as increasing the train service.

The recent advance of about $15 or $20 a bale in the price of cotton has stimulated the movement of that product in the Southwestern region. Harvest in the northern part of Texas is under way and wheat will begin to move from that territory within the next few days.

The movement of coal to the lakes is heavy, the total tonnage dumped into vessels to June 1 being one million tons in excess of the same period last year. The formation of the American Coal Exporters' Association and the Association's arrangement with the Shipping Board for definite allocation of ships is expected to stimulate the export business.

Demurrage Rates Reduced

In response to the pressure brought to bear by a committee of the National Industrial Traffic League, Director General Hines has issued supplement 2 to General Order No. 7 reducing demurrage charges from the rates established by Director General McAdoo early last year. Representatives of the American Railroad Association also recommended a reduction and Mr. Hines' action was taken after consideration of reports submitted to him by the divisions of public service, traffic and operation. The rates established last year are $3 per day for each of the first four days after the expiration of free time, $6 per day for each of the next three days, and $10 per day for each succeeding day. The new rates, which become effective on July 20, will be $2 per day for each of the first four days after free time and $5 per day for each day thereafter, which is approximately the basis in effect in 1917. The supplement also provides that the "average agreement," under which credits are allowed for unloading in less than the free time, will also be applied to cars held for loading, but the loading and unloading agreements will be kept separate. The average plan originally applied to both loading and unloading, but was changed on the ground that shippers naturally loaded their cars out as rapidly as possible and should not therefore be allowed credits which would enable them to waste time in unloading. On the other hand, some industries unload promptly, but waste car time by ordering cars in advance so as to have a supply always on hand for loading. The two averages are to be kept separate so that each class of car use will stand by itself.

In announcing the reduction in rates, Mr. Hines pointed out that demurrage charges are not imposed for the purpose of obtaining revenue, but to promote the punctual loading and unloading of equipment, and also that in view of the diminished purchasing power of the dollar and the increasing demand for equipment, it was doubtful whether the reduced rates would be sufficient to accomplish the desired purpose. He referred to the heavy movement of traffic expected within the next few months and announced that if the results were not successful he would feel impelled to increase the demurrage charges.

Imposing Sentence

UNITED STATES Judge Buffington in imposing sentence at Pittsburgh recently on certain railroad employees said:

The jury has found you guilty of stealing and having in possession goods stolen from an interstate shipment of freight. You were in a trusted position—the railroad service. You had been exempted from service on the other side of the seas; while other young men were risking their lives you were working at the railroad in the public service in the time of war. You have been generously treated by the Government in the way of wages. You had the esteem and respect of the people about you. You had a father who had carefully reared you; you had a wife and children. And it is a very painful thing for the court to have to pass sentence on you, but these are the things that courts cannot avoid. When a man comes up for sentence before the court there are three things to be considered; first, the man himself; he has already probably suffered enough and learned a lesson, but there are the interests of the public to be considered. These railroad thefts have grown to an extent during the time the government has had charge of them that have run up into the millions and millions of money. Now the money to pay for these goods that have been stolen has to be raised by other people—Liberty Bonds—those are the people who in the end have to make good those losses.

Then, my young friend, there is the interest of those who are engaged in the railroad business as well as yourself. All these things have to be borne in mind.

We have had in this District—in this circuit which is composed of New Jersey and Delaware and Pennsylvania—widespread evidence of this thing going on on all the railroads. We have had lots and lots of people who were taking, not as these goods of yours were, for your own family, but actually stopping the cars and taking quantities of copper and merchandise, not for their own personal use but for sale, making a business of stealing for profit and sale. Down in New Jersey we have had conductors, trainmen, in positions where others were influenced by their actions and their example, sentenced to five years imprisonment in the penitentiary. This has caused men to stop and think. Out here we have taken a milder course, but the thing goes on and it is quite evident that in order to save men from themselves the time has come when there must be more severe sentences imposed, and I can say to you for the judges that such heavier sentences will be imposed from this time, if this stealing continues.

I have taken all these matters into consideration, my young friend, because the court feels kindly towards you, kindly towards your wife, kindly towards your children, kindly towards your father; but the court has a solemn duty. I have taken into consideration the fact that these articles were not taken by you for the purpose of a trade and making money, and you were not in a position where your example would possibly lead other men. I am going to impose as light a sentence as I feel I can under the circumstances. I want to say to you, my young friend, that you made a serious mistake. Sometimes the mistakes that we make are the best things that ever happened to us; and this will be to you, if you learn

a lesson from the mistake. You will find in the penitentiary men who will drag you down, and you will find men there who will help build you up. You can build up your manhood. You can come back to where you lived; your friends are there and your family is there, and you can build up your manhood again, and you will do so. When you come back I want you to come and see me and talk it over as many another man has. I want you to take it like a man and make the best of it.

And I want to say to you on behalf of the judges here that the lightness of this sentence in your case is not to be taken as an example of what will come hereafter. I am following with you the lenient course that has been pursued here, but the judges, all of us feel, after consulting together, that the word should go out that hereafter those who come into the court charged and found guilty with offenses of this kind on the railroads will be dealt with more in the lines of what has had the effect of stopping things down in New Jersey, since that leniency has not resulted in stopping this epidemic of railroad crimes.

Checking Percentages By Chart

By William Wyer

Statistician, United States Railroad Administration, Operating Statistics Section

STATISTICS MUST BE REDUCED to significant percentages in order to attain their maximum value. This principle is generously illustrated in the summaries of the Operating Statistics Section of the Railroad Administration.

Such a large use of percentages, of course, means a great deal of office routine in the preparation of the summaries. As far as the Operating Statistics Section is concerned, however, much of this routine is limited to checking. Only percentages in the totals for districts and regions actually have to be computed, as figures for the individual roads are already computed on the O. S. forms. Not only percentages, but all figures derived from basic data must be checked before they are entered on the summaries, and this constitutes a large part of the work of preparation.

The chart has proved a great aid and time-saver, not only as an absolute check on percentages computed in a certain way, but also as an indirect check on all figures affecting the percentages in question. The chart applies to the following general case:

Suppose that one basic figure is divided by another basic figure to obtain an average. Suppose, further, that both basic figures are given for two consecutive months or years. The average will then be computed for these two periods, and there will, of course, be percentages of increase or decrease applying to both of the basic figures and to the average. The set of related figures numbers nine, as shown in the following illustration:

A. B. X. RAILROAD

Item	December, 1918	December, 1917	Per cent change
1. Net ton miles	124,337,000	108,808,000	14.3
2. Train miles	307,000	278,000	10.4
3. Net ton miles per train mile (1 ÷ 2)	405	392	3.3

Referring to the chart, and following the instructions thereon, its application as a check on the above figures may be readily seen.

Starting at the center (or origin)where the heavy lines cross, move straight to the right (along the horizontal axis) 14.3 spaces, thence straight up (parallel to the vertical axis) 10.4 spaces. The point arrived at is about seven-tenths of the distance from the diagonal line marked zero to the diagonal line marked five, and is below the zero line. The percent of change in the train load should, therefore, be an increase of about 3.5 per cent.

This simple operation not only checks the three computed percentages, but is also a close indirect check on the two computed figures for net ton miles per train mile. The operation of the chart can be mastered with a very little practice; and by interpolation to tenths between the diagonal lines, the reading on the chart will never vary more than two-tenths of one per cent from the correct calculated figure. A very slight mistake in any one of the four computed figures on which the final percentage depends will change this final figure more than two-tenths of one per cent. Any variation of more than two-tenths of one per cent is at once investigated. Errors of a smaller magnitude than this are negligible.

Additional sets of figures which the chart may be used to check are:

1. a—Net ton miles.
   b—Loaded freight car miles.
   c—Net ton miles per loaded car mile (or car load).
2. a—Loaded freight car miles.
   b—Total freight car miles.
   c—Per cent loaded to total car miles.
3. a—Total freight car miles.
   b—Total average number of freight cars on line daily.
   c—Car miles per car day.
4. a—Net ton miles.
   b—Total number of freight cars on line daily.
   c—Net ton miles per car day.

These are merely illustrations chosen from the monthly summary O. S. 5, of freight traffic movement and car performance. The application of the chart is, of course, much more general.

In constructing the chart, all the diagonal lines representing fixed values of P, the final percentage, start at a limiting point where both of the first two percentages are minus 100. This is natural; for, if both the basic factors on which the average depends decrease 100 per cent (that is, become zero), no computation is possible of the average or its percentage of change, which are thus made "indeterminate."

Another point on each diagonal line is fixed by the fact that these lines cross the heavy horizontal line at equal intervals. Thus the diagonal line along which P is always an increase of 25 per cent, crosses the horizontal axis 25 spaces to the right of the center. The logic of this may be seen if we consider that with no change in train miles, for example, the train load will follow fluctuations in net ton miles exactly. Or, mathematically, if P_2 (per cent change in train miles) is zero, we can only move backward or forward on the horizontal axis; and if the train load is to vary exactly with changes in net ton miles, the diagonal line with value 30 must cross this axis at value 30, and so on.

It should also be noted that when the two basic figures show identical increases or decreases, the chart will give a reading on the zero line. This is simply another way of saying that when net ton miles and train miles increase in the same proportion, the train load is stationary.

The proof that the lines joining the limiting point to the points on the horizontal axis are straight lines is purely mathematical, and is given below.

Let a = 1917 ton miles
b = 1918 ton miles
c = 1917 train miles
d = 1918 train miles

Then per cent increase in ton miles $= P_1 = \frac{b-a}{a} \times 100 \ldots\ldots\ldots\ldots (1)$

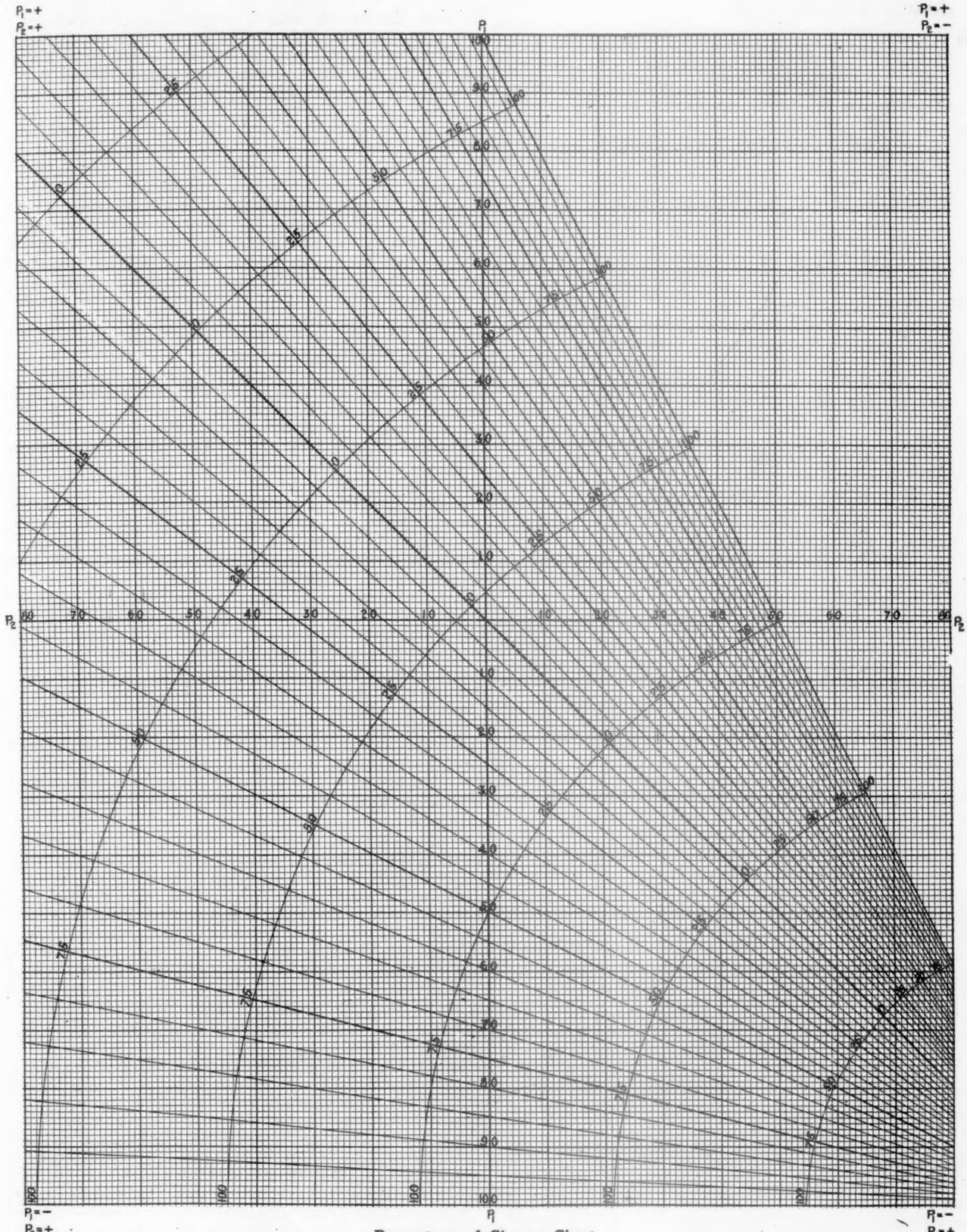
and per cent increase in train miles $= P_2 = \frac{d-c}{c} \times 100 \ldots\ldots\ldots\ldots (2)$

1917 ton miles per train mile $= \frac{a}{c}$

1918 ton miles per train mile $= \frac{b}{d}$

and per cent increase in ton miles per train mile $= P = \frac{\frac{b}{d} - \frac{a}{c}}{\frac{a}{c}} \times 100 \ldots (3)$

$$= \frac{1}{d} \times \frac{bc - ad}{a} \times 100 \ldots (4)$$



Percentage of Change Chart

Where comparative figures are given for two years and one item is divided by a second to obtain a derived unit, and where the percentage of increase or decrease of the first and second item are known, the percentage of increase or decrease of the third, or derived unit, can be read from the chart. Read the percentage of increase of the first item (P_1) from the center of the chart along the vertical axis, and from this point move parallel with the horizontal axis to the left the amount of the percentage increase of the second item (P_2). The point found related to the diagonal lines will show the percentage increase of the third or derived unit (P). Increases for P_1 are measured up, and decreases down. Increases for P_2 are measured to the right, decreases to the left. All points to the right or above the diagonal zero line give plus values for P. All points below or to the left of this line give minus values for P.

Subtracting (2) from (1)

$$P_1 - P_2 = \frac{b-a}{a} \times 100 - \frac{d-c}{c} \times 100 \quad \ldots\ldots(5)$$

$$= \frac{100}{c} \times \frac{bc-ad}{a} \quad \ldots\ldots(6)$$

Substituting (4) in (6)

$$P_1 - P_2 = P\frac{d}{c} \quad \ldots\ldots(7)$$

$$P = (P_1 - P_2)\frac{c}{d} \quad \ldots\ldots(8)$$

From (2)

$$P_2 = \frac{d-c}{c} \times 100$$

$$= 100\frac{d}{c} - 100 \quad \ldots\ldots(9)$$

$$\text{Whence } \frac{c}{d} = \frac{100}{P_2 + 100} \quad \ldots\ldots(10)$$

Substituting (10) in (8)

$$P = \frac{(P_1 - P_2)\,100}{P_2 + 100} \quad \ldots\ldots(11)$$

This is an equation in three variables. In order to plot it, one variable must, of course, be made constant, and this is what has been done by assuming various values for P. With P constant, the equation is of the first degree, and therefore represents a family of straight lines.

To determine the location of these lines,—

Let P = O and — 100

Equation (11) may be written:

$$P_1 = \frac{P\,(P_2 + 100) + 100\,P_2}{100} \quad \ldots\ldots(12)$$

If P = O, $P_1 = P_2$ ……(13)
If P = — 100, $P_1 = -100$ ……(14)

Solving equations (13) and (14), we find that the lines P= O and P= —100 intersect at the point (P_1 = —100, P^2 = —100). By substituting other values for P, it will be found that all the lines pass through this point.

If P_2 = O, we get from equation (12) that P_1 = P.

This determines the intersection of every line with the horizontal axis.

Equation (11) therefore represents a family of straight lines, all passing through the point (—100, —100), and intersecting the horizontal axis at distances from the origin proportional to the constant value assumed as noted above for P.

American Society of Civil Engineers Convention

THE AMERICAN SOCIETY of Civil Engineers held its forty-ninth annual convention at St. Paul and Minneapolis on June 17-20 with headquarters at the Radisson hotel, Minneapolis. Approximately 200 members were in attendance. Tuesday was devoted to the business of the association, the principal feature of interest being the presentation of a tentative report of the Committee on Development, the discussion of which consumed all of the afternoon session.

The committee tentatively recommended that while the society should continue to pursue the objects for which it was formed—the advancement of engineering knowledge and practice and the maintenance of a high professional standard among its members—the time has now come when it should adopt the principle of becoming an active national force in economic, industrial and civic affairs. To this end the committee recommended that a comprehensive organization be formed embracing: (1) The local affiliation of the branches of the national technical societies and the local technical societies, (2) A state council composed of representatives from the local affiliations, and (3) A national council consisting of representatives of the national technical societies and of the state councils or state group organizations in lieu thereof. The object of this council shall be to increase the usefulness of the engineering profession, and to bring about greater co-operation and to advance the welfare of engineers.

Dealing with the internal relations of the society, the committee recommended that every member of the society be a member of a local association; that there be created in each geographical district of the society an organization consisting of representatives of the local associations in that district; that the representatives of each district on the Board of Direction and the Nominating committee of the society be elected by ballot by the corporate members resident in the district; that there be an annual conference of representatives from the local associations for the purpose of discussing the welfare of the society and its members; that the Board of Direction refer for recommendation each application for membership to the local association in whose jurisdiction the applicant resides; that it be the duty of the local association to provide for the welfare of the younger members of the profession by (a) reasonable representation on the active committees; (b) encouraging their discussion of the general problems of the society; (c) arranging excursions to works of engineering interest; (d) promoting social intercourse between them and the older members; that a personal service bureau be maintained by each local affiliation, organized to co-operate in connection with a central service bureau to be maintained by the national council.

With reference to technical activities the committee recommended that local associations should hold not less than four stated meetings per year and should encourage joint meetings with kindred societies; that the fortnightly meetings of the parent society be discontinued; that the semi-annual meetings of the parent society be supplemented by the addition of a spring and a fall meeting to be held in different parts of the country; and that a more systematical and comprehensive system of securing papers be developed. The creation of special sections was disproved and the suggestion was made that such work be done by strong committees. It was also recommended that a book of recommended practices and standards be compiled.

Treating on the relation of the engineer to public affairs, it was recommended that a short code of ethics of broad scope, general character and positive rather than negative injunction be prepared; that a standing committee be created to consider questions of educational policy and to cooperate in carrying out such policies; that the society in cooperation with the other founder societies prepare a standard form of bill for the licensing or registration of engineers; that the national council maintain an agency in Washington, D. C., or elsewhere for the purpose of keeping advised of federal legislation and departmental rulings and regulations involving questions of engineering; and it was recommended that the creation of a national department of public works be supported.

The report was received favorably by the society and aroused active and extended discussion. The Board of Direction of the society has authorized another meeting of the committee to be held in the early fall at which an effort will be made to complete a final report for presentation at the annual meeting in January.

The remainder of the week was spent in visits to points of scenic and engineering interest in the vicinity of Minneapolis and St. Paul. On Friday the party left by special train for Duluth and the Missabe iron range where Saturday was spent in a tour of the range, returning to Duluth late Saturday evening.

A Department of Public Works

SENATOR JONES of Washington and Representative Reavis of Nebraska have introduced bills in Congress to create a Department of Public Works in which will be concentrated all the engineering and architectural activities of the government. It is proposed to change the name of the Department of the Interior to the Department of Public Works, to transfer to this department engineering activities now handled by other departments and to transfer from the Department of the Interior all functions not directly concerned with construction, engineering, and scientific matters. Present bureau organizations with their personnel are to be kept intact.

The activities not now included in the Department of the Interior which it is proposed to include in the Department of Public Works are the Supervising Architect's office, now subordinate to the Department of the Treasury; the Construction division of the United States Army; River and Harbor Improvements, the Mississippi River Commission and the California Debris Commission, now subordinate to the Department of War; the Coast and Geodetic Survey and the Bureau of Standards, now included in the Department of Commerce; and the Bureau of Public Roads and the Forest Service, now subordinate to the Department of Agriculture.

Among the activities to be transferred to other departments are the Patent Office, which is to go to the Department of Commerce; the Bureau of Pensions to the Treasury Department; the Bureau of Education to the Department of Labor; the Bureau of Indian Affairs and the Board of Indian Commissioners to the Department of Labor; St. Elizabeth's Hospital and the Freedman's Hospital to the Public Health Service of the Treasury Department and Columbia Institution for the Deaf and Howard University to the Bureau of Education, Department of Labor.

The bill provides that the secretary of the Department of Public Works shall, by training and experience, be qualified to administer the affairs of the department and to evaluate the technical principles and operation involved in the work thereof. Provision is made for four assistant secretaries to be appointed by the President with compensation of $7,500 each per annum and to have administrative jurisdiction respectively over engineering design and construction, architectural work and construction, scientific work and surveys, and land and legal matters.

The bill provides further that the engineering officers of the United States Army detailed to non-military duties in the Construction division of the United States Army, River and Harbor Improvements, the Mississippi River Commission and the California Debris Commission shall be detailed by the Secretary of War to like duties under the Department of Public Works for such period no exceeding two years as the Secretary of Public Works may find necessary to make the gradual transfer of these improvements to civil administration without detriment to the public interest.

The corps of engineers of the United States Army has expressed its opposition to this bill by arrangement for the introduction of a bill to create an "Auxiliary Engineering Corps" in the United States Army for duty on works of public improvement—a non-combative corps of engineers which shall be "under the command and direction of the Chief of Engineers, U. S. A. Its personnel shall be assigned by the Chief of Engineers to duties under his charge; specifically on river and harbor improvements, inland waterways, locks and canals, fortifications, embankments, levees, dykes, breakwaters, piers, and in the supervision and in the construction of national highways and bridges, and to any other public work that shall be now or hereafter assigned to the Chief of Engineers under the War Department. This organization shall also perform the duty of guarding and protecting all national public works."

The bill to create the Department of Public Works is the result of a conference of representatives of over 75 engineering societies in Chicago in April representing an aggregate membership of over 100,000 engineers. It has the backing of Engineering Council and the engineering societies of the United States in an effort to co-ordinate the extensive engineering and construction activities of the United States government which are now widely scattered in different departments with little or no attempt at co-ordination.

Railway Affairs in Congress

WASHINGTON, D. C.

CONSIDERATION of general railroad legislation was begun by the Senate committee on interstate commerce on Tuesday in executive session but the meeting was devoted mainly to an informal discussion of the course of procedure to be followed. It was decided to appoint a subcommittee of five members, headed by Chairman Cummins, to draft a tentative bill and report back to the full committee. The committee was to meet again on Thursday to consider the Poindexter fourth section bill on which hearings were concluded on June 19.

Chairman Esch of the House committee on interstate and foreign commerce now expects to begin hearings on the general railroad question about July 7.

Hearings before the House committee on Tuesday, Wednesday and Thursday of this week on the Cummins bill, S. 641, intended to restore the complete jurisdiction of the Interstate Commerce Commission over interstate rates, brought out a number of points which were overlooked by the Senate when it passed the bill without having held any hearings on it. E. E. Clark of the Interstate Commerce Commission, the first witness, indicated that the commission is not especially keen for being authorized to suspend rates initiated by the director general during the remaining period of federal control, and thereby sharing with the Railroad Administration the responsibility for the general advance in rates now generally believed to be forthcoming. Alfred P. Thom, representing the railroads, said the question of policy was one for the Railroad Administration to discuss. C. E. Elmquist, representing the state commissions, was sure the shippers wanted the former jurisdiction over rates of both the Interstate Commerce Commission and the state commissions restored. Director General Hines did not oppose giving the federal commission power to suspend his rates but did object to being made subject to 48 states. Both he and Mr. Thom expressed much greater concern over the provision of the act requiring the director general to pay final judgments for causes arising before federal control, out of the railroads' rentals.

Commissioner Clark informed the committee that the commission was not the proponent of the bill, and that while it understood there was considerable demand for it, it "had not felt the urgent necessity for legislation of this sort at this time." The commission, therefore, had nothing to say as to the question of policy but merely wished to point out several ambiguities in the language which Mr. Clark said amounted almost to fatal defects.

"The financial results of federal operation," he said, "have not been as satisfactory or as successful as we all might have wished, but the railroads were taken over as a war measure and we have not doubted for some time that the government would be obliged in the end to charge off a substantial deficit as a war cost. The responsibility heretofore has rested with the President. The commission has had no jurisdiction except to review his rates on complaint and the shippers have generally refrained from attacking the rates fixed by the director general, but that condition is gradually being changed. A continually increasing number of complaints is being filed, although they mainly involve questions of relationship. The enactment of this measure would give

a sort of divided responsibility. It would require the President to ask the permission of the commission before he could file any tariff carrying an increased rate, no matter how trivial. The commission does not shrink from any responsibility but some of us thought that suggestion ought to be made."

Regarding the defects in the bill, Mr. Clark said that as he interpreted its language it did not mean what the Senate committee said it was intended to mean, that it would preserve the authority of the director general over intrastate rates. It provides that the director general shall have the only right to initiate rates possessed by the carriers before federal control but shall be subject to all the limitations of the interstate commerce act and, therefore, Mr. Clark thought the jurisdiction over intrastate rates would revert to the states, while another section of the bill puts another limitation on the power to increase state rates by requiring 30 days' notice. He thought this provision was not sufficiently definite as to how the notice should be given.

The shippers, Mr. Clark said, seem to favor the restoration of the commission's power to suspend rates initiated by the director general, but the bill would also subject him to the limitation in the amended fifteenth section of the act, which requires the permission of the commission before a tariff increasing a rate can be filed and he thought Congress would hardly like to limit the director general in that way. He also pointed to other defects in the language.

The amendment to require the director general to pay out of the railroads' rental final judgments based on causes before federal control Mr. Clark said, he personally considered sound, because a man ought not to be kept out of his money merely because the government has control of the railroad property.

Alfred P. Thom, counsel for the Association of Railway Executives, said the question of policy is one for the Railroad Administration to discuss but he pointed out that the passage of the bill would result in a divided responsibility for the results of federal control. The railroad companies, however, are very much interested, he said, in the provision regarding the payment of judgments and in that suspending the statute of limitations as to claims to exclude the period of federal control. He said that the question of judgments does not involve merely the question of personal injury or freight loss and damage claims, but that the field includes the large contracts made by the director general for improvements to the property or for materials and supplies to replace those taken over. Under the federal control act, he said, the carriers may be sued for the acts of the director general for which they are not responsible and the corollary is a right to levy on their property. Therefore he suggested an amendment to provide that no process shall be levied on any property of a carrier for causes during federal control where the director general is liable, as between himself and the carrier. He also declared that the provision for payment of judgments out of the compensation due the companies is in direct contravention of the terms of the standard compensation contracts, which include a limitation as to what may be deducted from the rentals and he suggested an amendment to provide that deductions shall be made to pay judgments "except as otherwise provided in the standard contract."

Charles E. Elmquist, president of the National Association of Railway and Utilities Commissioners, said that before the bill is passed the peace treaty will be signed and, therefore, it should be considered in the light of normal peace conditions. The shippers demand the right to have an investigation and determination of the reasonableness of rates before they become effective and the bill should be passed as soon as possible to restore rights which the shippers had gained after years of struggle. There are indications, he said, that we are again facing a large increase in rates, possibly 25 to 30 per cent, and if that is so, it is especially important that the shippers should have the right to be heard before they become effective. He admitted that there might be some embarrassment to the director general in requiring him to ask the Interstate Commerce Commission's permission before filing an increased rate, but the protection required by shippers should have paramount consideration and any increases in rates during the expiring period of federal control should follow the former procedure and be filed with the fifteenth section board of the commission for a full report before the rates are made effective. He was particularly interested in preserving the authority of the state commissioners. The bill provides that a hearing shall be given, but does not say before what body. Mr. Elmquist suggested that it be amended to provide that no change or increase in intrastate rates be made without the approval of the proper state tribunals conformable to the laws of the several states. He argued that the state authorities realize the great increase in railroad expenses and thought there would be no difficulty because of their failure to act promptly, but when Representative Denison suggested that a state commission might consider it preferable for the federal government to bear a deficit rather than to impose a hardship on the shippers of the state, Mr. Elmquist said that the commission could deal with the question of discrimination under the Shreveport decision. If the jurisdiction is not restored, he said, there should be an amendment providing for review or suspension of intrastate rates initiated by the director general, by the Interstate Commerce Commission. Representative Winslow referred to the case of the Maine Central, which he said with an increase in traffic had an increase in expenses much greater than its increase in revenue and asked what the government should do for a road facing receivership by reason of such a condition. Mr. Elmquist said he was not prepared to say now what should be done in such a case.

Mr. Elmquist said that discipline and morale had suffered under federal control and he thought the railroads would be able to control their expenses by greater efficiency.

Director General Hines said he would discuss the bill on the assumption that it is the disposition of Congress to give the Interstate Commerce Commission power to suspend rates initiated by the President and that the relations of the Railroad Administration with the Interstate Commerce Commission are so close and cordial that the change would have little, if any, direct significance. It would not embarrass the Railroad Administration or change its procedure in any practical way. Mr. Hines said in an informal way the commission has been very helpful in giving advice on important rate matters and he felt that the Railroad Administration now should not undertake any important change in the rate structure without its advice. He pointed out, however, that because of the feeling that rates should not be decided entirely by railroad men, C. A. Prouty, a former interstate commerce commissioner, had been appointed in charge of the Division of Public Service and that its concurrence was required on all rates proposed by the Division of Traffic. In case of a disagreement, the matter was submitted to the director general. Later Max Thelen had been appointed director of the Division of Public Service and his concurrence is required. Moreover, the representation of shippers on the various local traffic committees has been increased so that they are evenly balanced between shippers and railroad men. The bill, however, goes beyond what is needed to accomplish the desired purpose, Mr. Hines said, because it apparently abolishes the machinery contemplated by the federal control act by which intrastate rates initiated by the director general are filed with the Interstate Commerce Commission. If this plan is abolished, the procedure for initiating intrastate rates would be relegated to the former procedure under the various state laws, under some of which the railroads had no power to initiate rates. Unless this was the purpose of Congress, he thought the entire situation could be met by a simple amend-

ment of the federal control act to provide that any rate initiated by the President in accordance with its provisions might be suspended by the Interstate Commerce Commission for a specified time pending an investigation. He pointed out that the bill in its present form would make the President subject to the fifteenth section amendment of August, 1917, requiring the permission of the commission before a tariff containing an increased rate can be filed, and would also subject him to the amendment of 1910, by which all increases in rates made after that date were presumed to be prima facie unreasonable and the burden of the proof was put on the carrier. The Senate bill, Mr. Hines said, would re-enact that presumption against any increase by the President, although that presumption is no longer reasonable in view of the diminished purchasing power of the dollar. He thought there was no great difference of opinion as to the intrastate rates, but that the question is important because the United States government has assumed responsibility for the railroad situation. The question of railroad revenues, therefore, becomes one of national policy. This represents an emergency situation of very great seriousness because the railroads will not remain under federal control for a very considerable time and if the government is left helpless as to intrastate rates because of the different conclusions of different states in no way responsible for the general policy, it will be impossible to carry out the conception of the federal control act. Mr. Elmquist's suggestion that the Interstate Commerce Commission control led the situation by its power over discriminations, he dismissed as impracticable, because, he said, if the government is to establish a rate structure which will protect the situation it must be in a position to act promptly and it would take many months to thresh out the question of discrimination in the way suggested by Mr. Elmquist.

As to the provision for the payment of judgments, Mr. Hines pointed out that the provision of the bill as to causes arising since federal control is unnecessary, because it is now the settled policy of the Railroad Administration to pay such judgments regularly and without question, but as to causes arising before federal control, the government should not be subjected to the burden of assuming the debts of the railroads without question. While the bill provides that such judgments shall be paid from the money owing to the railroads, Mr. Hines pointed out that this offered no protection to the government because nearly every railroad owes the government more for capital expenditures than the government owes it and the power of the government to deduct from the railroads' compensation is limited by the provisions of the standard contract. Therefore, if the government uses what it can deduct to pay judgments, it diminishes by that amount what it could deduct for the debts of the railroads to the government. This would leave it to get its money back in the best way it can. Moreover, he thought the only reason for such a provision arose from a very few instances of confusion or delay during the early period of federal control, because he was not aware of a single case now where a judgment against a railroad company remains unpaid because of inability to attach its property. Some railroads are insolvent but, generally speaking, it is incorrect to assume that the judgment creditor is without recourse because most companies have assets not under the control of the federal government which may be located and attached. The Railroad Administration will give every reasonable assistance to the creditor in locating such assets.

Mr. Hines also pointed out that the Senate bill omits the words "or with any order of the President" in the provision of the federal control act that carriers shall be subject to all laws and liabilities as common carriers except such as may be inconsistent with the provision of the act or with any order of the President. He said that within the scope and purpose of the federal control act it is necessary that the President shall have the right to make reasonable orders which are necessary in connection with the policy of unification. In spite of many technical obligations on the individual railroads, and that if these words are eliminated all sorts of things done reasonably in connection with the unification would be brought into question. He thought most of the dissatisfaction against such orders grew out of the necessity for emergency action during the early part of the period of federal control and that the causes of discontent have now been generally eliminated.

Hearings on the fourth section bill were concluded on June 19 after a large number of witnesses had been heard for and against the bill. Most of those in favor of it were the representatives of the intermountain section.

Receiving the German Railway Equipment

THE IMPORTANCE of the provision of the armistice calling for the delivery of 5,000 locomotives, and 150,000 freight cars to the Allied armies is best realized when it is understood that today a large share of the railway equipment in use on the railways of Belgium and northern France is of German origin. Some of the better fast passenger trains are equipped with German cars and still have the German signs and instructions in them. From the American point of view the further interesting fact is that Americans were assigned to the work of receiving a share of this equipment, of inspecting it and of putting it in condition for service.

By the terms of the armistice, Germany was ordered to deliver 5,000 locomotives, and 150,000 cars not including 19,021 cars needed to make up the quota of the railways of Al-

"U. S. Official" Photo

The Americans Who Received the Equipment and the Germans Who Handed It Over

sace-Lorraine which had to be "handed over together with their pre-war material and personnel."

The actual work of receiving the equipment was put in the hands of two Interallied Commissions for the Reception of German Railway material, one at Brussels consisting of a British, a French and a Belgian delegate and the other at Metz consisting of a French officer, Lieutenant Colonel Bachellery, and an American, Major N. F. Brown, was formerly an assistant engineer in the construction department of the Pennsylvania Railroad who was selected by Brigadier General W. W. Atterbury, Director General of Transportation of the A. E. F. to head the American section.

The locomotives to be delivered were originally divided into

three catagories based on hauling capacity, but later this was changed to include five categories, based on classes and types as follows: 1,000 capable of hauling a train of 900 tons minimum on a one per cent grade; 1,000 able to haul 800 to 900 tons on a similar grade; 1,500 and 1,200 able to haul 650 to 750 tons, and 300 able to haul from 650 to 700 tons. In each case the number acceptable in each series of Belgian, French and German locomotive was specified as well as the proportion of engines that might he supplied without separate tenders. The cars were similarly divided into eight classes as follows: 70,000 gondolas; 20,000 flat; 10,200 miscellaneous; 1,000 tank; 35,500 box; 2,500 freight baggage; 10,000 passenger and 800 passenger baggage cars.

Of the total number of locomotives, half were to be delivered to each commission—the commission at Brussels receiving 1,300 for the British army, 600 for the Belgian and 600 for the French. The 2,500 delivered to the Metz commission were to be divided 500 for the A. E. F. and 2,000 for the French.

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In the case of the locomotives delivered to the American Army the title was not to pass direct to the A. E. F., but the latter was to be given the use of the locomotives until such time as agreed upon. Great Britain had lost many of her imported locomotives in Flanders, also at Gouzecourt following the counter attack after the battle of Cambria in November, 1917. Belgium had lost heavily in engines during the invasion of her territory. Germany had also contrived to keep cars belonging to France in her country prior to the beginning of the war, and these, with what she subsequently destroyed and captured, made an immediate restitution to France imperative. Looked at in the broadest way the toll taken from Germany in cars and engines was, in the main, a replacement proposition, although of course, coming at such a time, the depriving her of this material had a retarding effect on a remobilization of her armies in case of an attempted renewal of hostilities.

The two commissions worked through a number of subcommissions which handled the administrative work at the receiving stations—the Metz Commission having five French sub-commissions and two American, the latter being later combined to form a third.

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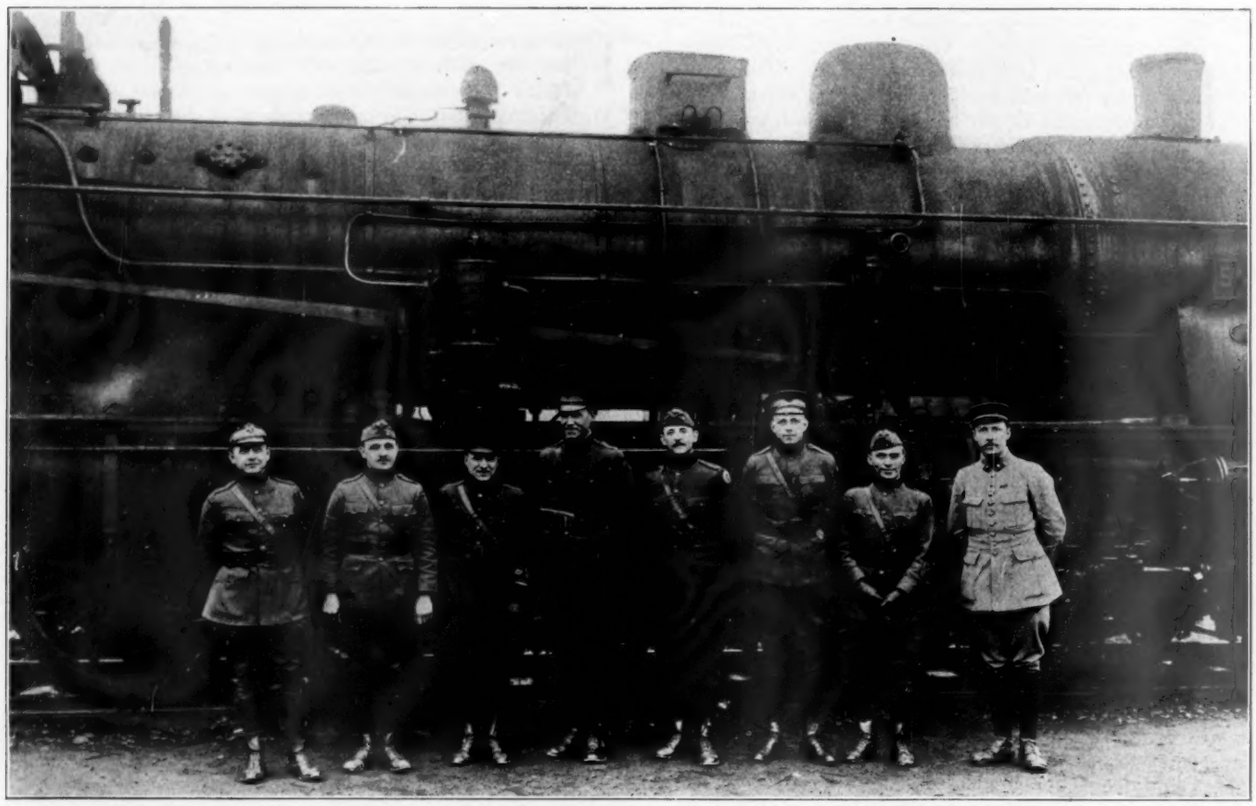

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It is interesting to note that the Americans rejected more of the locomotives delivered to them than they accepted. Of a total of 8,383 cars inspected, the Americans accepted 6,717 and rejected 1,666; but of the 225 locomotives the Americans inspected, only 82 were accepted and 143 were rejected.

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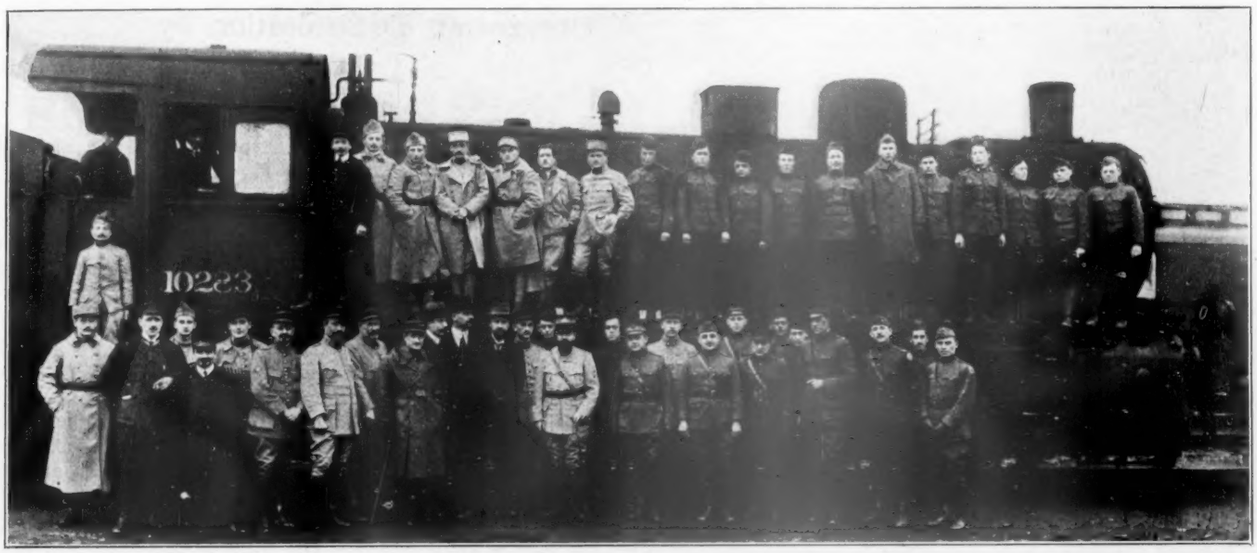

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Standard Contracts Executed

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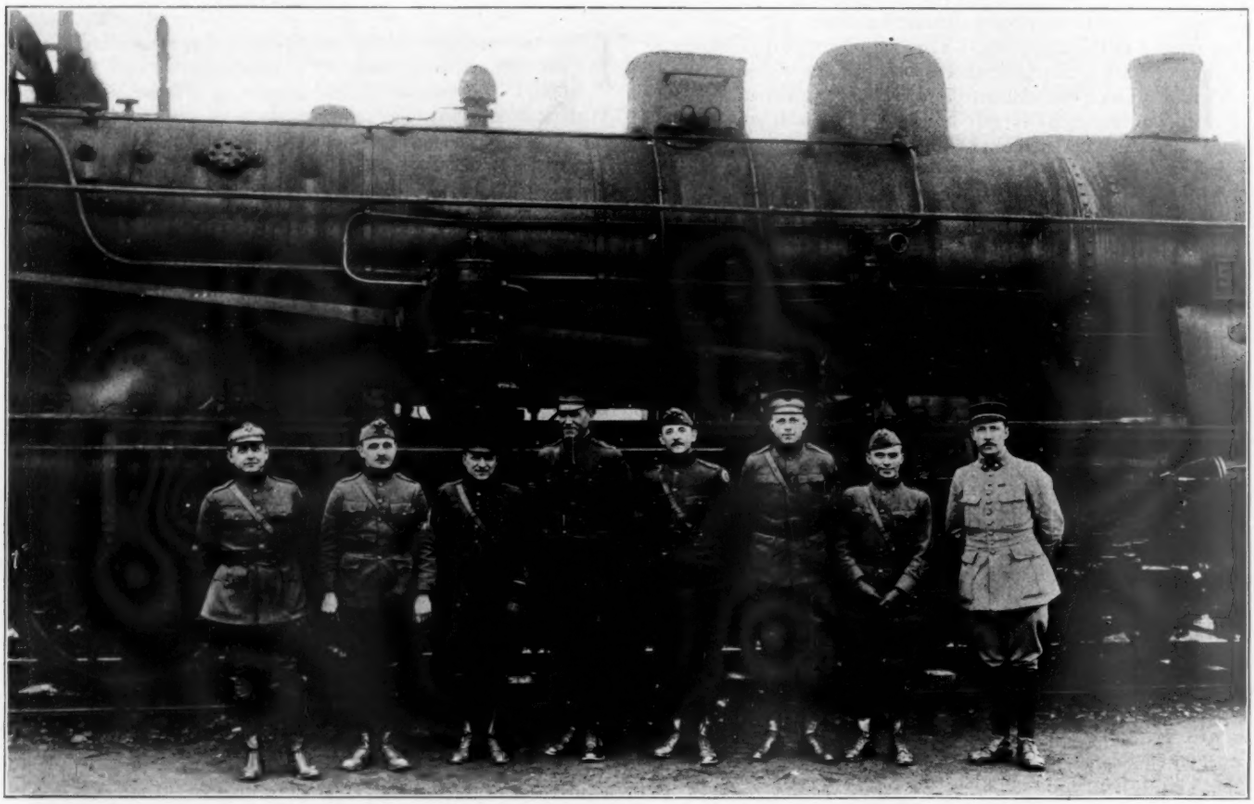

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Wolf River Valley	
Wyoming & Northwestern	

*Chicago, Burlington & Quincy Railroad Company	33 390,079
Black Hill & Fort Pierre	
Deadwood Central	
Quincy, Omaha & Kansas City	
*Chicago Great Western Railroad Company	2,953,449
*Chicago, Milwaukee & St. Paul Railway Company	27,946,771
Tacoma Eastern Railroad Company	
Bellingham & Northern Railway Company	
Seattle, Port Angeles & Western Railway Co.	
Milwaukee Terminal Railway Company.	
Puget Sound & Willapa Harbor Railway Co.	
Gallatin Valley Railway Company	
Chicago Junction Railway	916,804
Chicago River & Indiana Railroad Company	108,525
*Chicago, St. Paul, Minneapolis & Omaha Ry	4,934,789
*Cincinnati Northern Railroad	317,628
*Cleveland, Cincinnati, Chicago & St. Louis	9,945,738
Muncie Belt Railway	
*Colorado & Southern	2,833,573
*Wichita Valley	
Cumberland & Pennsylvania Railroad	255,692
*Detroit & Mackinac Railway Company	310,664
Detroit, Bay City & Western	85,967
Detroit Terminal Railroad	186,460
*Fort Worth & Denver City Railway Co	1,891,386
Galveston Wharf Company	526 069
Georgia & Florida Railway	88 000
Georgia, Florida & Alabama Ry	57 637
*Georgia Railroad	858 662
*Grand Rapids & Indiana	920 385
Green Bay & Western Railroad	331,954
Ahnapee & Western Railway Company	
Kewaunee, Green Bay & Western R. R. Co.	
*Great Northern Railway	28,771,360
Duluth & Superior Bridge	
Duluth Terminal	
Great Falls & Teton County	
Great Northern Equipment Company	
Great Northern Terminal	
Minneapolis Western	
Minneapolis Belt	
Montana Eastern	
Watertown & Sioux Falls	
Gulf, Texas & Western Railway (lump sum)	29,734
*Illinois Central	16,540,717
Chicago, Memphis & Gulf	
Dunleith & Dubuque Bridge	
Central Elevator & Warehouse Co.	
Mississippi Valley Corporation	
Indiana Harbor Belt	296,053
*Kansas City, Mexico & Orient Railroad	150,000
*The Kansas City, Mexico & Orient Ry. Co. of Texas	
Lake Erie & Eastern	127,081
*Lake Erie & Western	1,548,541
Leavenworth Terminal Railway & Bridge Co	43,583
*Lehigh & Hudson River Railway	519,371
*Lehigh & New England Railroad Company	1,135,760
*Lehigh Valley Railroad	11,321,233
*Los Angeles & Salt Lake Railroad	3,414,751
*Louisville & Nashville Railroad	17,310,494
*Louisville, Henderson & St. Louis Ry	343,915
Louisiana & Mississippi Railroad & Transfer Co	41,689
Louisville & Wadley Railroad Company	5,367
Memphis, Dallas & Gulf Railroad	28,295
*Michigan Central Railroad	8,105,727
Chicago, Kalamazoo & Saginaw	
*Minnesota & International Railway Company	202,455
*Missouri & North Arkansas	175,000
*Nashville, Chattanooga & St. Louis Railroad	3,182,089
New England Steamship Company	1,050,753
The Hartford & New York Trans. Co.	
New Bedford, Martha's Vineyard & Nantucket Steamboat Company	
*New Orleans Great Northern Railroad Company	575,951
*New York Central Railroad	58,122,084
Kanawha & West Virginia	
Zanesville & Western	
*Kanawha & Michigan	
*Toledo & Ohio Central	
*New York, Ontario & Western	2,103,589
*Norfolk & Western Railway	20 540 899
New River, Holston & Western	
Tug River & Kentucky	
Virginia-Carolina Railway	
Williamson & Pond Creek	
*Northern Pacific Railway	30,130,068
Big Fork & International Falls	
Gilmore & Pittsburgh	
Ocean Steamship Company of Savannah	1,048 782
*Pennsylvania Lines (West)	15,154,719
Wheeling Terminal Ry.	
Cincinnati, Lebanon & Northern	
Ohio River & Western	
Manufacturers Railway	
*Pennsylvania Railroad	53,663,427
Baltimore & Sparrow's Point Railroad	
*Cumberland Valley	
*New York, Philadelphia & Norfolk	
Union Railroad Company of Baltimore	
Barnegat Railroad	
Philadelphia & Beach Haven	
Roselyn Connecting Railroad	
†Philadelphia & Camden Ferry	401,556
*Pittsburgh & Lake Erie Railroad	8,980,219
Port Huron Southern Railroad	11,025
*Richmond, Fredericksburg & Potomac	1,137,373
*Rutland Railroad	1,023,883
Salina Northern Railroad	15,000
St. Louis Merchants' Bridge Terminal Ry. Co	412,427
*St. Joseph & Grand Island Ry. Co	373,811
St. Paul Bridge & Terminal Railway Company	67 509
*Southern Pacific	47,559,988
*Arizona Eastern	
*Houston, Texas Central	
*Galveston, Harrisburg & San Antonio	
*Texas & New Orleans	
Houston & Shreveport	
*Houston East & West Texas	
*Morgan's Louisiana & Texas R. R. & S. S. Co.	
*Louisiana Western	
Lake Charles & Northern	
Iberia & Vermillion	
Terminal Railway Association of St. Louis	2,574,510
Trinity & Brazos Valley (lump sum)	100,000
Trans-Mississippi Terminal Railroad Company	665,391
Union Freight Railroad Company	32,009
*Union Pacific Railroad	38,416,110
*Oregon Short Line	
*Oregon & Washington Railway & Nav. Co.	
Des Schutes Railway	
Green River Water Company	
Rattlesnake Water Company	
Union Pacific Water Company	
*Washington Southern	468,432
*Western Railway of Alabama	288,237
Wrightsville & Tennille Railroad Company	41,027
Winston-Salem Southbound Railway	260,251
Wiggins Ferry Company	416,675
East St. Louis Connecting	
St. Louis Transfer	
*Yazoo & Mississippi Valley	3,862,317
51 Class 1 Roads	
89 Contracts with total annual compensation	560.299,623
3 Contracts with lump sum of	129,734

Preventing Deterioration by the Proper Use of Paint

By J. W. Gibbons

General Foreman Locomotive Painter, Atchison, Topeka & Santa Fe

ONE OF THE MOST FERTILE fields for saving in the railroad industry has been practically ignored by the officers of the roads; that is the preservation of the property by painting. This statement is not made in a spirit of criticism for the same mistake has been made by the public in general. Railroad officers have disregarded the savings that could be effected by giving more attention to painting, not because they are indifferent to promoting economy, but because their training and education have been along other lines. Professor H. H. King of Kansas State Agricultural College has made a study of this particular question and recently stated that the lack of paint protection causes a greater annual loss through deterioration than the aggregate fire loss for the same period. The truth of this statement cannot be questioned, yet the prevention of a property loss by protection against fire receives much more attention than the prevention of deterioration by painting. The railroads employ men especially trained in fire protection methods to travel over the line constantly watching conditions and suggesting improvements. In every shop and terminal there is a fire chief whose word is law in all things pertaining to his department. Why not give the foreman in charge of the paint department some voice in the protection of equipment, since the lack of protective measures is causing a greater loss than fire?

Some will say that the railroads of this country expend hundreds of thousands of dollars each year for paint protection. However, careful observation will disclose the fact that painting is generally done because of the ornamental effect, the prevention of loss through deterioration being given secondary consideration or entirely disregarded. These two objects should not be separated. One should be incidental to the other, but preservation should be the controlling factor.

It is easy to find examples of the use of paint to secure ornamental effects while no thought is given to the preservation of material by its use. Not long ago while riding on the observation platform the conversation turned to the subject of the protection by painting, and I was able to point out object after object that was corroding for want of such attention. One striking example was found in the general store building which was a frame structure with a shingle roof. The entire building was well painted in attractive colors, the roof being a bright red, but the outside sheds made of corrugated iron were badly corroded having never

been painted. There was paint enough on the shingle roof where it was of no value to have covered all the corrugated iron buildings.

What is the remedy for the condition that prevails? It is not because of ignorance that such practices exist on railroads, but rather because those who realize the trouble have not the authority to correct it, due to the division of authority. The Master Car and Locomotive Painters' Association has made experiments which prove conclusively that heat treated or processed linseed oil will give greater protection against moisture and the action of sulphuric and other acids commonly found in railroad operation than raw linseed oil. This was publicly demonstrated at the convention of the association and the results have been confirmed by independent investigation. Nevertheless, the standard paint vehicle is still raw linseed oil, the reason being that the chemist cannot analyze or determine the purity of the heat treated or processed linseed oil. The objection is raised that under these conditions there is an opportunity for the substitution of cheap materials. Why not disregard the composition so long as the paint mixed with processed linseed oil gives the best protection?

Similar conditions exist in regard to varnish. Chemists cannot determine the exact nature of the oil used in the manufacture of varnish, but this, the most expensive material used in the railroad paint department, is commonly purchased upon service tests and the reputation of the manufacturer for maintaining quality. Even this last is not necessary for a competent master painter can determine in a very short time the quality of paint or varnish by the film test. The proper means for correcting the great loss by deterioration is to give the master painters the recognition they deserve. The railroads hire painters but seldom take their advice. If this were done deterioration could be minimized without spending any more money for paint materials than has been done in the past.

Prouty Proposes Plan for Adequate Revenues

Revenue Situation at the Base of the Whole Problem. Roads Should Be Returned on December 31

CHARLES A. PROUTY, former member of the Interstate Commerce Commission and now Director of the Division of Accounting of the Railroad Administration, who some time ago advocated a continuation of the experiment of government operation of railroads, has recently addressed a letter to a number of Congressmen and railroad men, declaring that the railroads should be returned to their owners on December 31 but that the government should retain a certain degree of control for another year while the financial relations between the railroads and the government are being adjusted. He estimated that the deficit for this year, if the first three months be taken as an index, will be $500,000,000 to $800,000,000. He also suggests some ideas for the future regulation of the carriers, in part as follows:

"The problem is to devise some method by which under private ownership rates shall be established which will yield to the carriers a sufficient revenue without imposing upon the public an unjust burden. Moreover, that plan must be such as can be adapted to the present exigency. As a contribution to the general discussion the following suggestions are made:

I. The Making of Rates

"Rates to be fixed by the Interstate Commerce Commission. Such rates to be absolute, with no right upon the part of the carrier to vary up or down.

"State rates to be fixed by the I. C. C. in collaboration with the state commission, or perhaps by the state commission, with the right of appeal to the I. C. C.

"The I. C. C. shall have power to fix divisions and also to approve agreements for the routing of traffic and the division of earnings from competitive traffic, but not until after full hearing upon notice to all interested parties, including the general public.

"The right to initiate rates, supervised as it is by the I. C. C., has been for the last five years of no advantage to the carrier. No advance in rates has been made which could not have been secured by an application to the Commission for a change in the rate.

"The right to reduce the rate without leave of the commission has not benefited the public, but has in the main proved a sort of vicious discrimination and disorganization.

"It is said that the commission could not make the railway rates of this country; and it could not with its present organization. With a proper organization it could make and publish those rates at a tithe of the expense under which the carriers now rest in that behalf. Still further, the rates so established would gradually assume a much more coherent, consistent, and permanent shape than they now have, to the immense advantage of the shipping public. As director of accounting I have charge of overcharge claims, and am satisfied that nineteen-twentieths of the undercharges and overcharges which so vex the shipper and which are so troublesome to the carrier, result from the complexities of our rate structures and the manner of the publication of our tariffs. All this might readily be removed if the commission itself made and published the rate.

"While the intrastate rate presents many difficulties in the solution, they are not at all insuperable. If some plan of actual co-operation can be put into effect they will disappear.

"The commission should have power to fix the divisions of a joint rate when the carriers themselves do not agree, thereby justly distributing the charge for the entire service among those carriers which participate in that service.

"In many cases competition might well be restrained with advantage to the carrier and without detriment to the public. To this end carriers should be permitted to enter into arrangements for the routing and division of traffic, or for the division of the earnings from competitive traffic. Such arrangements should only be permitted with the approval of the commission and upon conditions fixed by it.

II. The Basis for Such Rates

"The railroads should be self-supporting. To this end Congress should instruct the I. C. C. to establish such reasonable rates as will yield a fair return upon the value for rate-making purposes which it establishes.

"The amount of this return ought not to be prescribed. In the nature of things it cannot be the same upon the value of all carriers. To establish rates which would yield a given return (say, 6 per cent) upon the value of the most unfortunate carrier, would exact from the public too high transportation charges, while upon the other hand, to maintain rates so low as to yield only an adequate return upon the value of the most fortunate carrier would be extremely

unjust to its less favored competitors. The rates should produce an adequate return upon the average value affected by them.

"The value upon which this return should be allowed is that value which the commission is now fixing under the valuation act of 1913. Until now it has wisely refused to place a value upon any property until it could know from the facts before it what the result would be of applying the methods and principles adopted by it to the railroads of the entire country. Within the next two and one-half years it should have named the rate-making value of every considerable railroad property in the United States.

III. Disposal of Net Income from Operation

"Congress should provide that no carrier shall pay to its security holders out of its net operating income in any year more than a certain per cent upon the rate-making value fixed by the commission. The balance of its earnings should be distributed in the manner to be determined by Congress.

"All carriers in a given section must charge substantially the same rate. In the first place, many, and perhaps most, of these rates are directly or indirectly competitive and a carrier charging a higher rate would lose the business. But, in addition to that, there is a relation between communities within a given section which requires that a uniform scale of rates be maintained if serious discrimination is to be avoided. This means, of course, that one railroad will make a much larger net income than another, and perhaps the most difficult part of this whole problem is to find some way in which the weak road can be sustained without undue profit to the strong road.

"This can in a measure be accomplished by permitting the strong road to retain a sufficient amount to pay a fair return upon its value and by disposing of the balance in such a way as to encourage the carrier to secure the highest possible efficiency in operation and at the same time fairly protect the interest of the public. My own thought has been that this would be best accomplished under the following plan:

"The carrier should be allowed to pay to the owners of its securities which represent its carrier property, say, six per cent upon its rate-making value as determined by the commission. A few years ago this might have been too much; today less would be hardly fair. This would probably enable the carrier in the immediate future whose property was represented half by bonds and half by stock to pay a dividend upon its stock of at least 7 per cent.

"What remained over and above this in any year should be used for three purposes:

"(a) A certain amount, probably 2 per cent or 3 per cent upon the rate-making value, should be invested in the property itself, but upon condition that the amount of this investment shall not be made the basis of a claim for additional rates. There is in every railroad property, if the experience of the past be an index to the future, an invisible loss and a functional depreciation which cannot be taken care of in any other way. A reasonable rate should provide for this, just as much as for an adequate return to security holders.

"(b) In some way a guarantee must be provided for the payment of future interest and dividends. There will of necessity be lean years and fat years and the one should be made to offset the other. Rates cannot properly be varied every time the business increases or declines with a corresponding effect upon net returns. This guarantee fund should not be invested in the property, but should be held in the form of some quick asset.

"(c) Any balance remaining should be divided between the railway and the public, the public taking more as the amount increases; as, for example, the first 2 per cent to be divided equally, the next 3 per cent one to the carrier and two to the government, any additional amount one to the carrier and four to the government.

"Anything accumulated from this source by the government might be devoted in some form to the assistance of the weaker roads.

"Assuming that this scheme might be a workable one if the roads were once more in the possession of their owners, what steps should be taken to restore them and put in effect this plan?

"1. Government operation should continue as it is until January 1. Within that time the commission will be able to judge something of the future and to determine what changes, if any, in rates may be necessary.

"2. December 31, 1919, existing contracts should terminate and the properties be returned to the operation of their owners. The government should guarantee for one year a return equal to 75 per cent of the contract compensation in all cases where the contracts have been executed, and the carrier should be required to pay over to the government in all such cases 75 per cent of any excess which it may make over and above the contract compensation. If there is no contract there should be no guarantee and no payment.

"3. The government should retain for one year from January 1 a certain measure of control for certain purposes.

"Settlements must be made with the carriers, and to that end the government must have the right to call upon them for certain assistance and information.

"In restoring these properties there will be many adjustments as to the use of terminals, the joint use of equipment, etc., as to which the government must have power to act to avoid inconvenience to the public and due equity between the carriers.

"If the government is to guarantee a net income in any amount, it must have a certain supervisory power over the expenditures for maintainance of way and equipment.

"I also feel that it will be found necessary during this first year, while the financial status of these carriers is becoming re-established, so to speak, for the government to assist in the financing of improvements, including the purchase of equipment. This, however, ought not to involve any loss upon the part of the government.

"These suggestions do not profess to cover all the legislation which ought to be enacted at the present time. There is no mention of the supervision of securities, which certainly must be undertaken in some way by the federal government.

"Nothing is said as to control by the government of construction, maintenance and operation. While carriers should be left as free as possible in these respects, there are instances when the safety and convenience of the public must be protected. I have always myself believed that these matters could be best dealt with through some executive branch rather than by the commission.

"Another important subject not referred to is the consolidation of railroad properties. Today our railroads are, under government operation, consolidated into a single system, and the public is dissatisfied because there is no competition. To the extent that consolidation is permitted under private ownership, competition and the benefits of competition must disappear. There are, however, undoubtedly many instances where combination would result in economy of operation without injury to the service. Something should probably be done in this direction.

"Only the revenue situation, which really lies at the base of the whole problem, is covered here. The government must establish the rate, that is, the measure of compensation, while the private individual must furnish the service. Whether our system of transportation can be satisfactorily developed upon that theory is extremely doubtful, but it seems likely that some plan of the sort suggested will come as near meeting the difficulty as any."

General News Department

Brigadier General W. W. Atterbury, vice-president of the Pennsylvania Railroad, is now doctor of laws, that degree having been conferred upon him by the University of Pennsylvania.

Repeal of the daylight saving law, effective with the setting back of the clocks in October, has now been voted by both the House and the Senate and the bills are now in conference.

An appropriation of $2,500,000 for carrying on the railroad valuation being made by the Interstate Commerce Commission is provided in the sundry civil bill as passed by the House of Representatives.

The Veteran Employees' Association of the Middle Division of the Pennsylvania Railroad held its 23rd annual meeting and banquet at Harrisburg on June 19. J. C. Johnson, superintendent of the division, was elected president of the association for the ensuing year.

The American Association of Freight Agents, at a meeting held at Cleveland, Ohio, on June 17 and 18 authorized the executive committee of the Association to make application to the American Railroad Association for membership in that organization as a division of the Operating Section.

The Railway Mail Association at its 24th annual convention at St. Louis, Mo., June 17, 18, 19 and 20 discussed as paramount issues the establishment of a pension system whereby civil service employees of the government could be retired on a pension of $50 a month after 30 years service and the authorization of a Board of Appeal for postal employees.

The American Train Despatchers' Association held its annual convention at Chicago on June 17, 18, 19 and 20. Among those who addressed the delegates were James Davis, member of the War Industries Board, W. S. Stone, president of the Brotherhood of Locomotive Engineers, and A. B. Garretson, president of the Order of Railroad Conductors.

The Traffic Bureau of the New Orleans Association of Commerce has requested the Director General to have the headquarters of the New Orleans & Great Northern returned to New Orleans from Hattiesburg, Miss., in order that New Orleans merchants may have a greater opportunity to meet the requirements of the road in the matter of supplies.

The Brotherhood of Railway Express Employees held its first annual convention, opened at Chicago on June 23. Addison Bollinger, supreme president of the organization, urged the election of a committee to go to Washington to apply for a further increase in wages and also recommend the adoption by the brotherhood of a demand for a uniform wage scale in cities of the same size.

"Hunting Jack Rabbits with a Locomotive" is the title of an interesting pamphlet recently issued by George Bradshaw, supervisor of safety of the Pere Marquette and other Michigan railroads. He shows the similarity of action between jackrabbits, on the plains of western Canada, who race in front of trains, and trainmen and yard men who act in a similar manner while at work, to the detriment of the safety first movement.

The Brotherhood of Locomotive Firemen and Enginemen is holding its convention at Denver, Colo. Among those who have addressed the convention is Director General Walker D. Hines; also W. S. Stone, president of the Brotherhood of Locomotive Engineers, and other labor organization heads. J. F. McNamee, editor of the Brotherhood magazine was endorsed for a position on the Interstate Commerce Commission. An appropriation was voted to the Commercial Telegraphers' Union of America to sustain the members of that organization during the present strike.

The Trans-Siberian Railway

The President has agreed to advance $5,000,000, as the share of the United States in a fund of $20,000,000 contributed equally by Great Britain, France, Japan and the United States, for the relief of the Trans-Siberian Railway.

Five Years Wandering in the Wilderness

Pacific Electric box car 2586, which left the builders, American Car & Foundry Company, St. Louis, Mo., December, 1913, arrived on home rails (first appearance) May 18, 1919. It had made seventeen trips between the Middle West and Eastern States, three between Atlantic and Pacific ports, one trip between Colorado and Eastern states and two trips between Eastern states and Texas. On one road it stayed 108 days; another it visited nine times in one month. This is the last to arrive of ninety box cars bought in 1913.—Pacific Electric Magazine.

Improved Claim-Department Record

In fulfilling a promise made to shippers during the war that every effort would be made to dispose of outstanding claims as fast as competent help could be secured, the number of unsettled claims on hand in the Claim Departments of class 1 railroads in the Northwestern region has steadily decreased due to the re-employment of experienced clerks who have returned from service in the army and navy. The number of unsettled claims on hand February of this year totaled 150,019, which was decreased in March to 136,145, in April to 124,792 and in May to 113,443.

Automobiles on Crossings

During the first four months of the calendar year the records of the Southern Pacific show that of the 151 grade crossing accidents involving automobiles, 20 were cases where automobiles stalled on the crossing and were struck by trains; 68 automobiles attempted to cross in front of trains, 36 ran into the side of trains, 16 ran into and broke down crossing gates lowered to protect them, one skidded into the side of a car, one ran down and injured a crossing flagman, four ran into signal posts, and five accidents were unclassified. Nine deaths and 45 injuries resulted. This information, accompanied by a statement of what the railroads are doing to avoid crossing accidents, has been sent to the press by the Southern Pacific News Bureau.

Railway Executives

A. H. Harris, vice-president of the New York Central Lines, has retired from the standing committee of the Association of Railway Executives, and A. H. Smith, president of the New York Central, has been elected in his place. At a meeting held June 19 questions of accounting under the railroad contract were discussed. J. A. Taylor, chairman of the railroad corporate accounting conference, and G. A. Harwood, chairman of the Association of Railroad Corporate Engineers, were present by invitation. A conference was also held with a committee representing the American Short Line Railroad Association. The Short Line Committee was composed of Bird M. Robinson, chairman, and Ben B. Cain, L. S. Cass, F. J. Lisman, W. B. Dobson, H. B. Stewart and C. W. Pidcock.

REVENUES AND EXPENSES OF RAILWAYS

FOUR MONTHS OF CALENDAR YEAR, 1919—CONCLUDED

Name of road.	Average mileage operated during period.	Operating revenues			Operating expenses						Operating ratio.	Net from railway operation.	Railway tax accruals.	Operating income (or loss).	Increase (or decr.) comp. with last year.
					Maintenance of										
		Freight.	Passenger.	Total (inc. misc.)	Way and structures.	Equipment.	Traffic.	Transportation.	General.	Total.					
St. Louis, Brownsville & Mex	548	1,042,352	448,684	1,583,178	256,775	276,809	19,557	499,843	64,337	1,117,321	70.57	465,857	40,000	425,721	33,460
St. Louis Merchants Bridge Terminal	9	.....	3,033	861,792	220,957	219,806	3,044	703,674	24,552	1,172,033	135.99	—310,242	32,000	—342,242	—381,080
St. Louis-San Fran	4,761	15,693,831	6,449,903	23,370,322	4,225,924	5,108,275	190,250	9,378,877	712,761	19,501,276	83.44	3,869,045	941,782	2,916,598	230,679
St. Louis, San Fran. & Texas	134	336,523	46,081	412,689	89,232	85,151	5,137	268,251	24,218	472,589	114.51	—59,900	5,756	—65,716	—236,752
St. L. Southwestern	939	3,211,308	628,590	3,998,854	908,623	953,775	68,279	1,288,305	151,952	3,403,355	85.11	595,499	155,949	438,356	—1,326,468
St. Louis, Southwestern Ry. of Texas	814	1,309,573	424,454	1,856,896	568,739	730,774	26,263	937,301	95,837	2,353,152	126.72	—496,256	84,000	—580,374	—735,014
San Anto. & Aransas Pass	732	870,297	321,117	1,280,675	380,500	428,376	23,975	725,518	72,899	1,629,093	127.20	—348,418	60,000	—409,267	—540,900
Seaboard Air Line	3,565	8,527,206	3,993,427	13,766,771	2,161,591	3,043,866	245,919	6,572,086	418,068	12,493,375	90.75	1,273,396	540,000	731,166	—1,221,061
St. Louis Transfer	6	.....	.....	320,393	43,213	65,806	825	174,502	8,410	292,755	91.37	27,638	400	27,238	—13,011
South Buffalo	11	157,338	.....	444,133	22,112	66,337	1,144	230,631	6,839	327,064	73.64	117,070	10,200	106,870	334
Southern Ry.	6,982	24,573,284	11,540,984	39,214,317	6,615,543	10,089,414	486,055	17,383,104	1,074,644	35,918,944	91.60	3,295,373	1,286,496	1,981,308	—7,440,240
Southern Ry. in Mississippi	278	321,848	190,700	551,464	157,937	88,553	8,822	304,163	17,068	576,539	104.54	—25,075	36,000	—61,210	—111,290
Southern Pacific	7,049	32,626,068	12,664,603	48,931,943	9,244,330	10,587,329	433,479	19,789,701	1,156,115	42,085,164	86.01	6,846,779	2,461,025	4,372,908	—4,002,838
Spokane International Ry.	156	214,565	58,452	280,766	54,576	29,530	6,351	108,999	17,281	215,944	76.91	64,822	19,969	44,852	—48,252
Southern Pacific Steamship Lines	.....	3,257,668	166,998	3,601,265	41,158	694,327	45,297	2,686,845	94,089	3,561,716	98.90	39,549	45,901	—6,352	—71,894
Spokane Portland & Seattle	554	1,591,413	466,974	2,227,347	482,908	384,922	24,346	788,834	76,737	1,763,563	79.17	463,783	236,800	226,822	—660,781
Staten Island Rapid Transit	23	306,491	259,816	660,535	93,060	98,419	3,754	371,931	36,016	603,181	91.32	57,354	44,000	13,311	109,121
Tennessee Central	293	645,037	172,565	874,058	351,742	235,203	12,028	396,374	26,376	1,021,722	116.89	—147,664	20,540	—168,308	—231,979
Terminal R. R. Assn. of St. L.	36	.....	13,102	1,171,534	289,155	283,240	3,292	585,043	25,251	1,199,735	102.41	—28,211	113,000	—141,212	—269,219
Texarkana & Ft. Smith	87	335,607	64,387	436,887	84,831	87,815	3,016	201,071	13,132	385,562	88.25	51,325	27,143	24,148	—101,247
Texas & New Orleans	469	1,604,737	645,910	2,411,342	491,678	756,827	21,020	926,438	57,062	2,320,604	96.23	90,739	84,343	3,596	—624,697
Texas & Pacific	1,946	7,169,990	2,720,037	10,400,301	1,815,145	2,281,797	102,401	5,346,693	289,110	9,914,575	95.32	485,726	339,882	144,955	—1,480,346
Toledo & Ohio Central	435	1,943,487	255,757	2,306,615	478,485	826,712	24,269	1,070,454	63,706	2,472,143	107.18	—165,528	126,561	—292,124	—173,322
Toledo, Peoria & Western	247	314,282	188,976	525,872	107,859	159,729	8,956	255,754	23,570	553,682	105.28	—27,811	34,000	—61,811	—21,116
Toledo, St. L. & Western	454	2,049,808	109,169	2,256,714	374,566	517,177	20,925	946,817	47,140	1,906,621	84.48	350,093	104,000	245,989	—131,419
Trinity & Brazos Valley	368	311,748	73,390	405,108	156,789	169,032	6,619	233,936	29,692	596,068	147.13	—190,960	20,859	—213,888	—136,806
Ulster & Delaware	128	171,073	45,872	288,827	39,473	75,750	5,012	244,152	18,709	385,317	133.41	—96,490	19,200	—115,743	—85,198
Union R. R.	35	.....	.....	2,382,459	220,514	634,452	1,028	1,260,160	29,949	2,144,987	90.03	237,472	25,712	211,760	—678,326
Union Pacific	3,614	24,102,018	6,284,561	32,782,686	5,044,787	6,142,527	184,575	9,949,513	898,934	22,947,662	69.99	9,836,024	776,844	9,056,096	1,867,481
Utah Ry.	98	348,560	1,919	355,200	37,972	90,421	988	74,084	7,923	211,388	59.51	143,812	16,298	127,513	—71,903
Vicksburg, Shreveport & Pacific	171	662,676	288,422	1,028,271	192,036	224,037	11,068	402,629	31,827	869,534	84.56	158,736	37,667	120,832	—117,565
Virginian Ry.	499	2,426,617	205,234	2,922,215	602,903	924,325	19,044	1,317,725	60,435	2,910,473	99.59	11,742	146,900	—135,165	—754,643
Wabash	2,519	10,727,993	2,799,153	14,449,065	2,043,974	2,885,489	205,323	7,976,868	434,768	13,622,489	94.27	826,576	428,090	397,866	—503,541
Washington Southern	35	526,368	793,657	1,470,576	147,335	154,174	10,817	477,923	25,528	832,895	56.63	637,681	26,704	610,954	256,890
West Jersey & Seashore	361	1,075,200	1,705,233	3,020,359	734,849	671,084	30,366	1,842,387	85,338	3,383,076	112.01	—362,717	171,793	—534,927	187,278
Wichita Falls & N. W.	328	410,769	135,161	574,664	191,575	102,623	5,084	322,097	28,746	650,125	113.13	—75,461	36,838	—112,413	—15,539
Western Maryland	707	3,707,667	304,372	4,378,020	880,864	1,524,592	73,991	2,611,753	165,884	4,699,269	107.34	—321,249	172,800	—494,049	—479,263
Western Pacific	1,011	2,633,250	424,581	3,191,942	951,084	715,456	43,112	1,216,233	89,575	3,074,816	96.33	117,125	182,257	—65,423	—907,723
Western Ry. of Alabama	133	507,805	317,424	885,329	106,476	189,664	11,309	336,092	25,378	682,186	77.05	203,143	30,000	173,141	—34,441
Wheeling & Lake Erie	511	2,561,942	198,097	3,046,637	709,338	893,500	25,225	1,472,575	100,279	3,209,684	105.35	—163,047	218,800	—382,446	—521,284
Yazoo & Miss.	1,382	5,309,837	1,709,268	7,836,040	1,282,737	1,632,210	59,896	3,042,346	200,051	6,083,467	77.63	1,252,573	272,666	979,454	—733,978

Wires to Be Returned to Owners

Both Houses of Congress have passed bills for the return of the telegraph and telephone lines of the country to their owners. The Senate acted first and its bill provides that existing rates shall be continued for a period of 90 days and that the return shall be "forthwith" upon the approval of the act by the President. The House bill would extend the existing rates for six months and provides that the return shall be within 30 days, and so timed as to complete a full calendar month for accounting purposes. The conferees have adopted the House plan for the date of the return, but adopted a provision that telephone rates shall remain effective for four months unless sooner changed by State authority.

Winnipeg Strike

After much rioting and the declaration of martial law, conditions at Winnipeg are again quiet and the soldiers called to police the city have been withdrawn. Rioting began on June 21, thousands of strikers being engaged. Conflicts ensued with the provincial police and one man was killed and many injured.

The strike of a number of firemen, switchmen and enginemen in sympathy with the general strike badly crippled freight yard service at Winnipeg last week although passenger service was maintained without serious interruption. The places of these men were rapidly filled, however, and the sympathetic strike, insofar as the railway workers are concerned, lost much of its force.

A New Federation?*

"The trend of thought today in labor organization seems to favor government ownership and operation of the railroads. I am not so sure this attitude is the correct one, as it was never intended by the founders of this government that it should be paternalistic. I believe that the government should give the workers the full opportunity of using the complete machinery of labor organizations in accomplishing a desired end, and rather than, to, through some idealistic notion, hold out as bait things that are known to be impossible. Through the unhampered use of these organizations, men will be able to see to it that equitable rates of wages are paid, sanitary and healthy working conditions obtained, that the eight-hour day should prevail, and such other conditions be made that the worker, whether on a railroad or wherever he may be, has the proper and necessary opportunities for rest and recreation. Not all these things are feasible under government administration. Simply having a desire for a certain condition or wanting it is not sufficient to obtain it. You must formulate some plan for your betterment, and then you must put that plan into effect. Just what such a plan may be, is not within my province to point out. Behooves you to "keep a clear track" of the many palliatives that are now being offered and promised, none of which are guaranteed, even under government administration. All that you attain and obtain must be brought about by your own and the combined efforts of your fellow workers, and with the co-operation of those only who have the interest of the worker at heart, and not those or those things now brought forward to blind issues in order that a select few may benefit by political preferment because of having trotted out some will-of-the-wisp.

Railroad managers and operators in the years gone by have taken advantage of the vast store of knowledge possessed by the members of the four big railroad brotherhoods and sought their co-operation for the benefit of both parties and much was accomplished by this co-operation. Greater efficiency can be obtained and better conditions and pay-rates can be effected if all railroad employees' organizations will work hand in hand along these lines. For some time back, our committees have been meeting with a great deal of opposition in Washington; just what or who may be back of all this undercurrent of opposition I am unable to say, but this I do know, that the time has come when we should get together the various units or organizations in railroad service now outside of the American Federation of Labor and bring about a federation strictly for railroad men, and I was authorized by my convention to go about arranging for a meeting of the chief executives or representatives of these various organizations. I have interviewed the representatives of a dozen different organizations, all of whom have expressed their desire to attend such a conference, and I have, therefore, called this meeting in Washington at the Continental Hotel for Monday, June 30.

*Extract from address delivered by President of the Order of Railroad Station Agents E. M. Morton at the American Train Despatchers' Convention, Chicago, June 18, 1919.

Efficient Airplane Mail Service

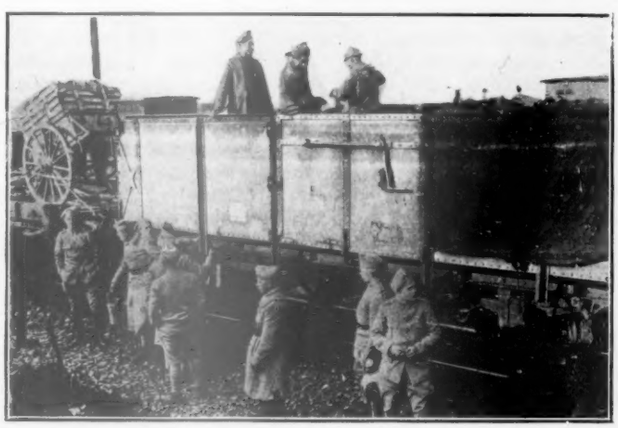
Second Assistant Postmaster General Otto Praeger reports that 58 consecutive trips of 325 miles each have been made by airplanes between Chicago and Cleveland without delays, without forced landings and without engine trouble of any sort. These flights have been made in weather which a short time ago would have been regarded prohibitive. Each day, each way, the "ships" carried 400 pounds of letter mail. As letters range from 40 to 45 to the pound, this means that 16,000 were transported on each trip.

Notwithstanding the inclement weather, the postal planes maintained an average speed of 98.5 miles an hour. On one occasion, when a squall prevailed throughout the Lake region, and was so severe as to paralyze shipping in Chicago harbor, the mail plane reached Chicago on time and made a perfect landing.

Twelve L. W. F. De Haviland planes are in the Cleveland service, four being stationed at each terminal and four at Bryan.

Henceforth, the mail planes will leave Chicago for the east at 2:30 p. m. It was found that 151 business concerns sent special messengers to the railroad stations each day (12:30 p. m.) to catch the two fast mail trains to the Atlantic seaboard. The 2:30 airplane service is expected thus to save much time. Mr. Praeger says that satisfactory operation of the air mail between Cleveland and Chicago has been the means of relieving rail congestion, and one distributing car each way each day has been cut from that division. Experiments are now being carried on looking toward the delivery and taking aboard of mail bags while the airplane is in flight. Another interesting development is the construction of fireproof walls between the mail compartment and the engine and the compartment and the gas tank.

As a result of protests registered at Washington by dealers and by the Minnesota Railroad & Warehouse Commission, proposed increases of 30 cents a ton in the freight rate on Illinois coal shipped to Minnesota points have been submitted by the Railroad Administration to the Interstate Commerce Commission for advice.



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One of General Haller's Polish Army Trains on Its Way Through Germany

Traffic News

L. D. Knowles, division freight agent of the Missouri Pacific at Kansas City, Mo., has resigned to become traffic manager of the H. & H. Refining Company at Kansas City.

H. D. Driscoll, secretary-manager of the Waco (Tex.) Chamber of Commerce for the past three years, has resigned to become manager of the Oklahoma Traffic Association at Oklahoma City, Okla.

D. R. Lincoln has resigned as chairman of the Kansas City, Mo., District Freight Traffic Committee and has been succeeded by J. R. Koontz, a member of the committee. F. J. Shubert has been appointed a member of the committee to succeed Mr. Koontz.

National Industrial Traffic League

The National Industrial Traffic League held a special meeting at Milwaukee, Wis., on June 11, 12 and 13, at which committee reports, held over from the New Orleans meeting of the league last March, were disposed of. The reports of the executive committee stated that since the New Orleans meeting the special committee and the executive committee had endorsed the recommendations *submitted by President Freer* with respect to railroad legislation. S. Davies Warfield, president of the National Association of Owners of Railroad Securities, and Max Thelen, director of the Division of Public Service, United States Railroad Administration, spoke at the dinner on the second night of the meeting. Mr. Warfield expounded his plan for solving the railroad problem and Mr. Thelen spoke on the Railroad Administration's side of matters interesting to members of the league.

The recommendations relative to remedial legislation oppose the extension of the period of government operation, but counsel due regard to the interests of the public, including investors in railroad securities. Pending the return of the railroads to corporate control it is recommended that section 10 of the Act of March 21, 1918, be amended to provide that during the continuance of government operation, present rates shall remain in effect until changed by the Interstate Commerce Commission. After return to corporate operation jurisdiction over rates, to be the same as prior to March 21, 1918. For the future the recommendations include repeal of anti-trust and anti-pooling legislation, as affecting railroads, and the encouragement of co-operative activities among common carriers. If pooling of traffic is permitted it should be under the approval of the Commission. The shipper should not be deprived of the right to route his freight. The Commission should have authority to prescribe minimum rates to regulate the issuance of railroad securities, including supervision of the expenditures of the proceeds to require extensions and additional facilities and to exercise general supervision over service, operation and maintenance. It should co-operate with State Commissions, and it should control interchange of traffic between rail and water carriers, establish joint routes and rates and the divisions of rates.

The League does not favor continuance of the law of August 9, 1917, which requires that tariffs be approved by the Commission before filing. Rates should be initiated by the carriers, subject to a suspension, as under Sec. 15; but the Commission should prescribe publicity by the carrier of contemplated rate changes, and provide for conference between the carriers and the interested public before tariffs are filed.

The League earnestly insists that federal regulation of common carriers be vested in the Interstate Commerce Commission exclusively, does not advocate regional commissions, believing that the Commission now has ample power to establish branch offices. As to intra-state commerce, no legislation is recommended; it is believed that, with the clarifying of the situation as the result of the Shreveport and other cases, the Interstate Commerce Commission can work out plans under which conflicts between federal and state regulation will largely disappear.

Commission and Court News

Interstate Commerce Commission

The commission has denied petitions of the director general of railroads and the Atchison, Topeka & Santa Fe for a rehearing in connection with its standard time zone investigation.

Perishable Freight Investigation

The Commission, at the request of the director general of railroads, has ordered an investigation concerning the charges and regulations contained in Perishable Freight Tariff No. 1 prepared by the Railroad Administration, which are intended to supersede, with a few exceptions, those in all other general tariffs. It is desired that this new tariff shall be filed to become effective as soon as possible and the director general, in accordance with a provision in the federal control act, has requested the commission to advise him whether it is desirable that its provisions should become effective or in what respect they should be modified. The tariff contains many changes in rules and regulations and many increases in accessorial charges. A proof copy of the proposed tariff has been the subject of extended conferences between officers of the Railroad Administration and representatives of the shippers. The commission announces a series of hearings before Attorney Examiner Marshall at the following places: Los Angeles, July 7; Portland (Ore.), July 16; Denver, July 23; Chicago, July 30; New York, September 2; Atlanta, September 11, and New Orleans, September 18.

State Commissions

The Public Service Commission of Pennsylvania, considering an application for a decision on switching charges at Towanda, announces that the case cannot be considered; the Supreme Court of the United States having ruled that the authority of the director general of railroads, acting for the federal government, is supreme in rate-making, the commission is without authority.

United States Supreme Court

Original B. L. Not Superseded By Subsequent Bills

The Supreme Court of the United States holds that the terms of the bill of lading given by the initial carrier are binding upon the shipper and all connecting carriers, and cannot be waived by subsequent bills of lading.

Leatherwood made, in 1913, a shipment of horses from Watrous, N. M., to Waco, Tex., over four connecting railroads. The initial carrier's through bill of lading barred any action for damages unless begun within six months. When the horses reached the Texas & Pacific and the M., K. & T., each insisted that the shipper accept and sign a new bill of lading, and he did so. In 1915 he brought suit in a Texas State Court for injury to the horses while in transit on the lines of those two companies. The bills of lading issued by them did not contain the provision requiring suit to be brought within six months; but the carriers set up as a defense the provision to that effect in the original bill of lading. The state courts ruled that the carriers could not rely on that provision. The Supreme Court of the United States takes a contrary view.

Under the Carmack Amendment to the interstate commerce act the parties to a bill of lading cannot waive its terms, nor can the carrier by its conduct give the shipper a right to ignore them. A different view would antagonize the plain policy of the act and open the door to the very abuses at which it was aimed. The receipt given by the initial carrier embodies the contract for transportation from point of origin to destination; and its terms are binding

upon the shipper and all connecting carriers. Texas & Pac. v. Leatherwood. Decided June 9, 1919.

Written Notice of Claim for Loss

The Supreme Court of the United States calls attention to the enlargement of the definition of the term "transportation" by the Hepburn Amendment to the interstate commerce law, in connection with the necessity of written claim for loss or damage.

The plaintiffs delivered to the Toledo, St. Louis & Western at East St. Louis, a car of horses for transportation under a Limited Liability Livestock bill of lading via the Erie to themselves at Suffern, N. Y. At Suffern the car was placed on track opposite a cattle chute and left in charge of plaintiffs for unloading. They were about to lead out four horses when other cars were pushed against it and injured the animals. No written claim was made for the loss or damage as provided in the bill of lading; and when sued the railroad defended upon that ground. The plaintiffs maintained that transportation had ended when the accident occurred and consequently no written claim was necessary. The state courts of New York accepted that view. But the United States Supreme Court granted the railroad's request for an instructed verdict in its behalf. The clause requiring presentation of a written claim is clearly valid and controlling. In C., C., C. & St. L. v. Dettlebach, 239 U. S. 588, the court said that Congress had recognized the duty of carriers to perform a variety of services that, according to the theory of the common law, were separable from the carrier's service as carrier. In the present case, if the railroad's employees had been doing the unloading there could be no doubt that transportation was still in progress; and giving charge of the removal to the plaintiffs, as agreed, was not enough to end the interstate movement. The animals were in the car; no adequate time for unloading had elapsed. The railroad had not fully performed the services incident to final delivery imposed by law. These included the furnishing of fair opportunity and proper facilities for safe unloading although the shippers had contracted to do the work of actual removal. Written notice of claim was therefore necessary. Erie v. Shuart. Decided June 9, 1919.

F. W. Burton, assistant manager of the Minneapolis Traffic Association, has been appointed manager of the Traffic Bureau of the Rochester (N. Y.) Chamber of Commerce, succeeding D. P. Chindblom.

A report of business conditions in the Northwestern region for week ending June 14, show that a total of 154,018 cars were loaded on lines, as compared with 163,859 cars loaded during the same period in 1918.

While this shows a decrease of 9,841 cars compared with 1918, there was an increase of 18,920 compared with the first week of June, this year. There was practically a 100 per cent increase in grain and grain products loaded, an increase in livestock and an increase of practically 2,000 cars in miscellaneous loading.

A very heavy ore movement is anticipated for the balance of the season. There is also a heavy movement of automobiles and manufactured articles, and a decided improvement in the shipment of cement and other building materials. The export situation at Puget Sound ports is in a very satisfactory condition, 661 cars being delivered to boats last week. Crop conditions generally are favorable except in the Western portion of North Dakota and portions of Montana where rain is needed.

A summary of passenger train performance in the Northwestern region for the month of May, as compared with the same period last year shows a marked improvement. Of a total of 9,595 trains operated during May this year, 8,608, or 89.71 per cent, were on time, whereas in 1918 of a total of 9,605, 7,974, 83.02 per cent were on time. A marked improvement is noted in the trains received from connections, the percentage of those on time increasing from 83.68 per cent in 1918 to 92.48 per cent in 1919.

Equipment and Supplies

Locomotive Deliveries

New locomotives were shipped to railroads under federal control during the week ended June 1 as follows:

Works.	Road	No.	Type	Individual Engine No.
American,..	G. T.	5	USRA 6W.Sw.	801-05
	E. J. & E....	5	USRA Mikado	802-06
	P. L. W....	11	USRA Santa Fe	9838, 9839, 9845, 9849, 9851, 9853-58
	B. & O.....	13	USRA 6W.Sw.	370-82
	P. L. W....	2	USRA 6W.Sw.	8174, 8262
		36		
Baldwin,....	B. & O.....	2	USRA Pacific	5200-01
	B. & O.....	1	USRA 6W.Sw.	369
	A. T. & S. F.	3	Pacific	3406-08
	S. P.	5	Santa Fe	3632-36
	Erie	1	USRA Pacific	2915
	N. & W.....	1	Mallet	1717
	C. C. & O..	1	Mallet	704
	A. T. & S. F.	1	Mountain	3710
	C. B. & Q...	1	Mikado	5359
	M. K. & T....	2	USRA 8W.Sw.	39-40
	Southern	1	USRA Mountain	1489
	Total.....	19		
	Total.....	55		

Locomotives

THE PENNSYLVANIA EQUIPMENT COMPANY, 1420 Chestnut street, Philadelphia, Pa., is in the market for a 36-in. gage climax locomotive, a 20 or 22-ton class A or a 25 to 35-ton class B.

Freight Cars

THE WISCONSIN & NORTHERN, Appleton, Wis., is inquiring for inspection cars.

O. B. CINTAS, Havana, Cuba, has ordered 40 cane cars from the American Car & Foundry Company, Chicago.

THE A. J. YAWGER COMPANY, Indianapolis, Ind., is inquiring for one 40 ft. 50-ton steel underframe flat car.

THE AMERICAN RAILWAY EQUIPMENT COMPANY, Philadelphia, Pa., is inquiring for 25, 50-ton steel underframe flat cars.

THE PROVIDENCE GAS COMPANY, Providence, R. I., is inquiring for one all-steel hopper car and one all-steel gondola car.

C. H. HUGHES & COMPANY, Altoona, Pa., has ordered 50 mine cars from the American Car & Foundry Company, Chicago.

THE NORTHWESTERN IRON COMPANY, Milwaukee, Wis., is inquiring for 3 steel underframes for 80,000-lb. capacity flat cars.

THE CARROLLTON COAL COMPANY, St. Benedict, Pa., has ordered 330 mine car trucks from the American Car & Foundry Company, Chicago.

THE AMERICAN METAL COMPANY, New York, has ordered two 5,200-gal. tank cars from the American Car & Foundry Company, Chicago.

THE ISLAND CREEK COAL COMPANY, Huntington, W. Va., has ordered 350 mine cars from the American Car & Foundry Company, Chicago.

THE NEWPORT NEWS SHIP BUILDING & DRY DOCK COMPANY, Newport News, Va., is inquiring for one 40 ft. 240,000 lb. capacity flat car.

THE AMERICAN TRADING COMPANY, Havana, Cuba, has ordered 30, 30-ton all-steel cane cars from the American Car & Foundry Company, Chicago.

THE POND CREEK, COAL COMPANY, Huntington, W. Va., has ordered 250 composite mine cars from the American Car & Foundry Company, Chicago.

Signaling

THE CHESAPEAKE & OHIO has ordered from the Federal Signal Company, Albany, N. Y., an electro mechanical interlocking machine, 28 and 8 levers, for installation at Prince, W. Va.

THE CHICAGO, BURLINGTON & QUINCY has ordered from the Federal Signal Company, Albany, N. Y., a 96-lever, type "4" electric interlocking and other material for installation at Hawthorne, Ill. The control will be Federal type "4" with direct current for operation and alternating current for indication.

Railway Construction

DENVER & RIO GRANDE.—Immediate resumption of work on the extensive improvements at Soldier Summit, Utah, has been ordered by the United States Railroad Administration. About 40 or 50 freight train crews have their headquarters at Soldier Summit. The improvements include a station building, a hotel, 26 miles of yard tracks and several shop buildings.

THE TOYAH VALLEY SULPHUR COMPANY, NEW ORLEANS, LA.—This firm plans to build a railroad approximately 15 miles long from its mines near Orla, Texas, to its property in Culberson county. Contracts for the work have not been let and it is not certain when construction will begin. M. J. Epley, president of the Toyah Valley Sulphur Company, will be president of the railroad company.

THE SOUTHERN RAILWAY has given a contract to M. M. Elkins, Macon, Ga., for building a bridge at Gaffney, S. C. The bridge and retaining wall approach will be of reinforced concrete construction. The structure will consist of three spans, one of which will be 35 ft. long and the other two 26 ft. long. The cost of the work will be about $30,000. The bridge near Spencer, N. C., over the Yadkin river, at mile post 330.8 to consist of four single track deck riveted steel spans about 160 ft. long designed for Cooper's E-60 loading. Repairs will be made to portions of the existing masonry. The estimated cost for the entire work is about $170,000. The American Bridge Company has the contract for fabricating and erecting the superstructure.

Supply Trade News

The Ball Engine Company, Erie, Pa., builder of Erie Ditchers, is putting up an addition to its erecting shops, 175 x 125 ft.

F. G. Echols, for many years general manager of the small tools department of Pratt & Whitney Company of Hartford, Conn., has accepted a position as vice-president of the **Greenfield Tap & Die Corporation,** of Greenfield, Mass.

Mudge & Company, Chicago, will open a district office July 1 in the Railway Exchange building, St. Louis, Mo., in charge of **Sherman C. Amsden,** assistant to president, who has been promoted to district manager of the Southwestern territory.

Samuel F. Joor, consulting engineer of Chicago, has joined **the American Steam Conveyor Corporation,** Chicago, in a capacity of sales engineer. Mr. Joor has had wide experience in the conveyor field, at one time being western manager and sales engineer of the Jeffrey Manufacturing Company, previously being with the Link Belt Company.

The Blaw-Knox Company, which recently sold its plant at Wheatland, Pa., will concentrate its entire manufacturing activities at its plant at Hoboken, Pa., which is being greatly enlarged. The complete plant at Hoboken occupies a site covering 50 acres and will employ about 1,200 men. Further developments at this plant include the purchase of 15 acres for the construction of working men's homes.

Following the return of **Fred A. Poor,** president of The **P. & M. Company,** Chicago, from a six weeks' trip abroad, announcement has been made of the organization of The P. & M. Company (England), Ltd., with offices at 31 Budge Row, London, E. C. This company has acquired license under patents held by L. P. Winby & Company, of London, and Gillespie Partners, Ltd., of London, as well as under all the foreign patents held by The P. & M. Company of Chicago. **L. P. Winby,** formerly of **L. P. Winby & Company,** Queen Anne's Chambers, Westminster, London, S. W., will be the managing director of The P. & M. Company (England), Ltd. The other directors are: F. C. Winby and Fred A. Poor.

At the initiative of the **American Concrete Pipe Association,** a joint committee has been organized for the study of

"U. S. Official" Photo

Roundhouse Personnel, R. T. O. Camp de Grasse, St. Pierre des Corps, Intre et Loire, France

specifications for concrete culvert pipe. The committee is to be composed of one representative from each of six associations which were invited to participate. All of these societies have appointed members except the American Society of Civil Engineers, which is still to be heard from. Members of the committee appointed thus far include **Paul Kircher,** sales engineer, Massey Concrete Products Company, Chicago, representing the American Concrete Pipe Association: T. R. Agg, Iowa, State College, Ames, Iowa, representing the American Association of Highway Officials; **F. L. Thompson,** chief engineer, Illinois Central, Chicago, representing the American Railway Engineering Association; **B. S. Pease,** American Steel & Wire Company, Chicago, representing the American Concrete Institute; **A. T. Shelley,** assistant engineer, sewer construction department, city of Philadelphia, representing the American Society for Testing Materials. The first meeting of this committee will be held at Atlantic City on June 27.

Aftermath of Government Contracts

The Director of Munitions reports that the total claims against the government on cancelled war contracts, settled and unsettled, will amount to $700,000,000. If these 24,199 contracts had been carried on and completed, the cost to the government would have been $6,000,000,000. The actual amount awarded thus far by reason of termination or curtailment is $152,000,000. Vast stores of material had been accumulated under rapidly accelerated efficiency of production in anticipation of continuation of the war. In machinery, there were 500 manufacturing plants in the United States which were working for the various War Department bureaus. To stimulate production, the War Department had largely provided the funds with which machinery had been purchased and additions constructed, so that on the cessation of hostilities, the War Department had to take over the surplus commodities and the plant facilities and equipment that assumption of war work had entailed. To flood the market at this time with the commodities held by the government contractors, and the machinery with which they had been manufactured, would have upset industrial conditions; so that a director of sales was created, with a corps of expert assistants; and all material was classified, and sections to attend to its disposition created. The selling of surplus war materials is now going on. Sales are made for cash, at auction, to highest bidder; or on sealed proposals, at current market price; or by negotiation under competitive conditions. —*The Bache Review.*

Trade Publications

VANE RELAYS.—The Union Switch & Signal Company, Swissvale, Pa., has issued bulletin No. 92, describing in great detail the company's single and double element vane relays. The different types are described, with illustrations, to the extent of a dozen pages, together with an explanation of the theory of the operation of the relays.

FORCE PUMPS.—The Humphreys Manufacturing Company, Mansfield, Ohio, has issued the first of a series of bulletins illustrating and describing its new types of pumps. These bulletins are 7½ in. by 10⅝ in. in size and are punched for standard ring or post binders. They contain essential data and dimensions of the different types of pumps described.

COAL STORAGE.—The International Conveyor Corporation, New York City, has issued a 16-page booklet describing the Stuart system of ground storage and pointing out its adaptations in railway work. The book contains detailed descriptions of the coal handling layout at the East Buffalo, N. Y., terminal of the Erie, the government fuel storage and distributing yard at Washington, D. C. and Baltimore & Ohio installations for the handling of coal and bulk materials respectively at Baltimore. The booklet is well illustrated and well gotten up and gives a comprehensive idea of the possibilities of this form of ground storage and reclaiming as applied to a variety of railway problems.

Railway Financial News

BALTIMORE & OHIO.—A syndicate composed of Kuhn, Loeb & Co., Speyer & Co., and the National City Company, has purchased $35,000,000 Baltimore & Ohio ten-year 6 per cent secured gold bonds. The issue will be offered for public subscription at 96½ and accrued interest, to yield investors approximately 6½ per cent if the bonds are held until they mature, on July 1, 1929. The bonds are secured by the deposit and pledge of $6,000,000 par value Reading Company first preferred stock, $14,000,000 par value Reading Company second preferred, and $9,200,000 common stock, as well as $15,000,000 Baltimore & Ohio Railroad Company refunding and general mortgage 6 per cent bonds, series B, due Dec. 1, 1995. These securities have an estimated market value of $45,000,000, and it is understood that a 25 per cent margin is to be maintained. The bonds were sold by the company to enable it to meet all its maturing obligations, and will not materially increase the railroad's annual fixed charges.

The maturing obligations which will be taken up are $22,500,000 notes and bank loans which were extended from February, 1918, to July 1, 1919. These include $4,000,000 bank loans, $10,500,000 6 per cent notes, issued in June, 1918, for retiring $7,500,000 one-year 5 per cent notes, $3,000,000 bank loans, extended for four months from Sept. 30, 1918, and $8,000,000 notes issued in January, 1918, which were due last July but were extended.

Following a meeting of the Baltimore & Ohio directors on Wednesday, President Daniel Willard said the company had reached an agreement with the government on the question of compensation for the lease of the carrier's properties during the period of federal control, and that a contract had been executed calling for the payment each year by the government of $30,031,009. He also said the company's other income each year amounts to about $3,300,000, making the approximate annual income $33,331,009. This after the deduction of $22,063,000 fixed charges and corporate expenses, would leave a balance of $11,268,009 available for federal income taxes, reserves, dividends, and so forth.

At its meeting, the directors determined to set aside part of the income to be devoted to capital expenditures so that the company's credit would not have to be extended further under present conditions. Because of the adoption of this policy, it was decided temporarily to suspend dividend payments on the common stock. The usual semi-annual dividend of 2 per cent was declared on the preferred stock to holders of record July 19. This payment will be made September 2, provided the company receives funds from the government by that time.

BOSTON & MAINE.—Minority stockholders have filed a bill in equity in the Massachusetts Supreme Court against this company attacking the validity of outstanding loans of the road and its leased lines amounting to $13,000,000, which the legislature of 1915 authorized the company to pay. It is claimed that the act is unconstitutional, in that the legislature exercised both executive and judicial powers, and also that it deprives persons of property without trial by jury.

CANADIAN PACIFIC.—The Hon. William J. Shaughnessy has been elected a director to succeed the Hon. James Dunsmuir, resigned.

CHICAGO, INDIANAPOLIS & LOUISVILLE.—This company has applied to the Public Utilities Commission of Illinois for an order authorizing the issue of additional first and general mortgage bonds to the amount of $867,198.

PEORIA & EASTERN.—W. A. Carnegie Ewen, New York, has been elected chairman of the protective committee for the 4 per cent income mortgage bondholders, to succeed John F. Wallace, resigned.

TERMINAL RAILROAD ASSOCIATION OF ST. LOUIS.—An application has been filed with the Missouri Public Service Commission for permission to issue $1,000,000 4 per cent bonds, payable in 1953.

Railway Officers

Railroad Administration

Regional

R. D. Starbuck, assistant to federal manager of the New York Central, has been appointed assistant regional director of the Eastern Region, with headquarters at New York.

Federal and General Managers

S. E. Burkhead, assistant general manager of the International & Great Northern, with headquarters at Houston, Texas, has resigned to enter business in Houston.

J. R. Hackett, general agent of the Georgia Northern, has been appointed general manager, with headquarters at Moultrie, Ga., succeeding **F. R. Pidcock,** who resigned as general manager, but will retain his position as vice-president of the road. **J. D. Weston, Jr.,** of Albany, will succeed Mr. Hackett as general agent.

Operating

A. B. McNaughton, superintendent of the Grand Trunk Lines in New England, with his staff, has moved from Island Pond, Vt., to Portland, Me.

L. L. Oliver, trainmaster of the eastern division of the Texas & Pacific, with headquarters at Marshall, Texas, has resigned and will return to his former position in the despatcher's office.

Financial, Legal and Accounting

F. Markoe Rivinus has been appointed general solicitor of the Norfolk & Western with headquarters at Roanoke, Va., to succeed **Theodore W. Reath,** who has resigned to accept service with the Norfolk & Western Railway Company.

Traffic

B. N. Austin, assistant traffic manager (passenger) of the Baltimore & Ohio, western lines, has been appointed general passenger agent, with headquarters at Chicago, Ill.

W. F. Conner, district passenger representative of the Pennsylvania, Lines West, with headquarters at Pittsburgh, Pa., has been promoted to assistant general passenger agent, with office at Chicago, succeeding **C. L. Kimball,** who retired from active duty after 51 years of continuous active service. **A. H. Shaw,** assistant to general passenger agent, has been appointed assistant general passenger agent, with office at Pittsburgh. **S. L. Shank** has been appointed district passenger representative, with office at Pittsburgh, succeeding Mr. Connor, and **A. B. Ritchie** has been appointed tfaveling passenger representative, with office at Pittsburgh, succeeding Mr. Shank.

Engineering and Rolling Stock

F. S. Kelly, master mechanic of the Louisiana division of the Texas & Pacific, with headquarters at Gouldsboro, La., has been transferred to Marshall, Texas, succeeding **R. E. Roe,** resigned.

Sidney U. Rhymer, whose appointment as signal engineer and superintendent of telegraph of the Chicago & Alton, the Chicago, Peoria & St. Louis, the Peoria & Pekin Union and the Peoria Railway Terminal, with headquarters at Bloomington, Ill., was announced in the *Railway Age* of June 6 (page 1,450), was born on December 20, 1876, at Union Grove, Ill. He began railway service in June, 1896, as a section laborer on the Chicago & North Western near Fulton, Ill., and on March 1, 1901, he was promoted to section foreman at Union Grove. On October 15, 1905, he entered the signal department of the same road as battery man at Fulton, in which capacity he remained until February, 1907, when he was promoted to signal maintainer with headquarters at Stanwood, Ia. In 1910 he was appointed signal supervisor of the Northern and Southern divisions of the Chicago & Alton with headquarters at Bloomington, Ill., and on January 1, 1913, he was promoted to general signal inspector with jurisdiction over the entire line in which position he acted as assistant to the signal engineer until his recent promotion.

Purchasing

Albert C. Mann, purchasing agent of the Illinois Central with headquarters in Chicago, has resigned to become vice-president of the American International Steel Corporation with headquarters in New York.

Corporate

Executive, Financial, Legal and Accounting

H. P. Hughes has been appointed auditor and general freight and passenger agent of the United Verde & Pacific Railway and the Verde Tunnel & Smelter Railroad Company, with headquarters at Clarkdale, Ariz., in place of **W. H. Archdeacon,** resigned.

Operating

J. McMillan, general manager of the Pacific Electric Railway Company, retires from active service July 1, after 45 years of service with the Southern Pacific lines and the Pacific Electric. The vacant position will not be filled.

U. E. Gillen, vice-president of the Grand Trunk Railway of Canada, with headquarters at Montreal, Que., has been appointed general manager of the Toronto Terminals Railway Company, with headquarters at Toronto, Ont., vice J. W. Leonard, deceased.

Engineering and Rolling Stock

C. C. Johnson, roadmaster at Campbellton, N. B., of the Canadian National Railways, has been transferred in the same capacity to the Mulgrave sub-division, with headquarters at New Glasgow, N. S., succeeding **H. I. Gray,** who has been transferred to the Bridgewater division of the Halifax & Southwestern. **William Sidwell** has been appointed roadmaster of the Dartmouth sub-division, with headquarters at Dartmouth, N. S., vice **James Myers.**

Obituary

Charles Carney, formerly supervisor on the Illinois Central, with headquarters at La Salle, Ill., died at his home in Chicago on June 21, at the age of 64 years.

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American Food Arriving in Warsaw, Poland

Railway Age

Vol. 66 June 27, 1919 No. 26

Observation Trains at Yale-Harvard Boat Race

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*Every Other Week

†Once a Month

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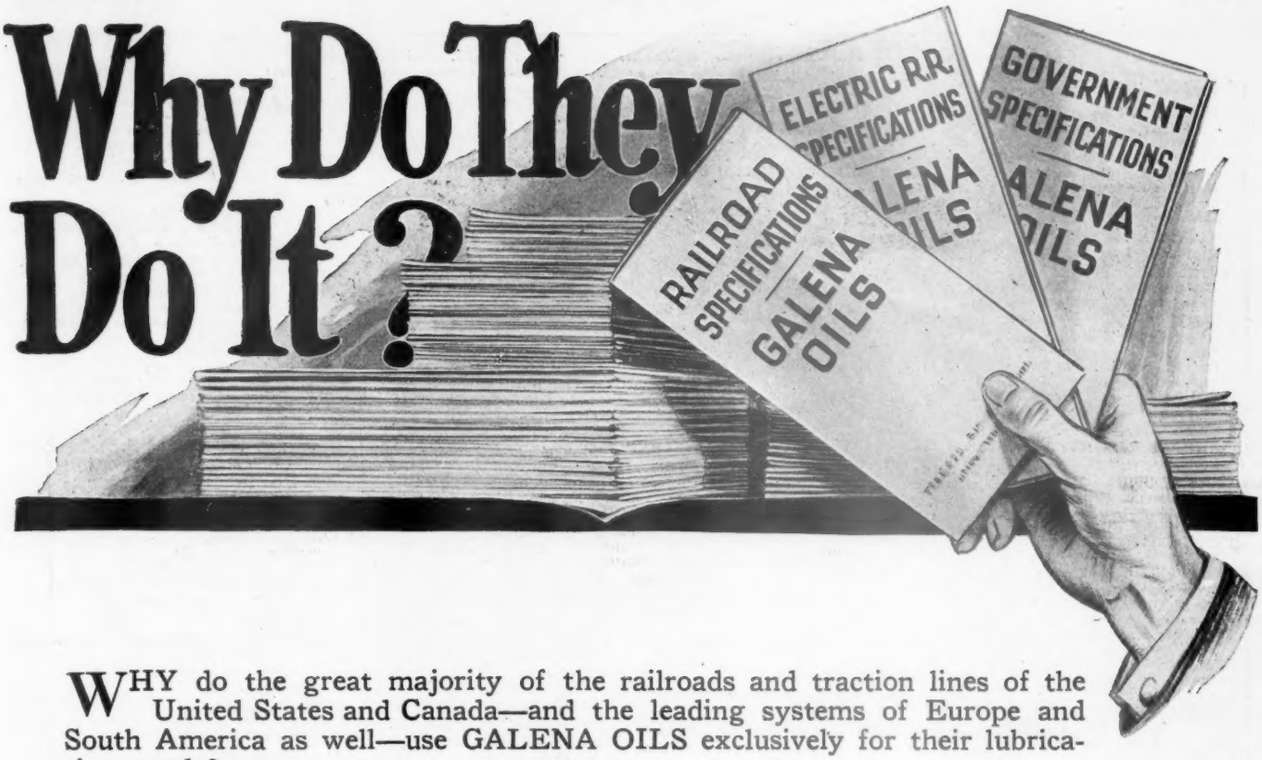

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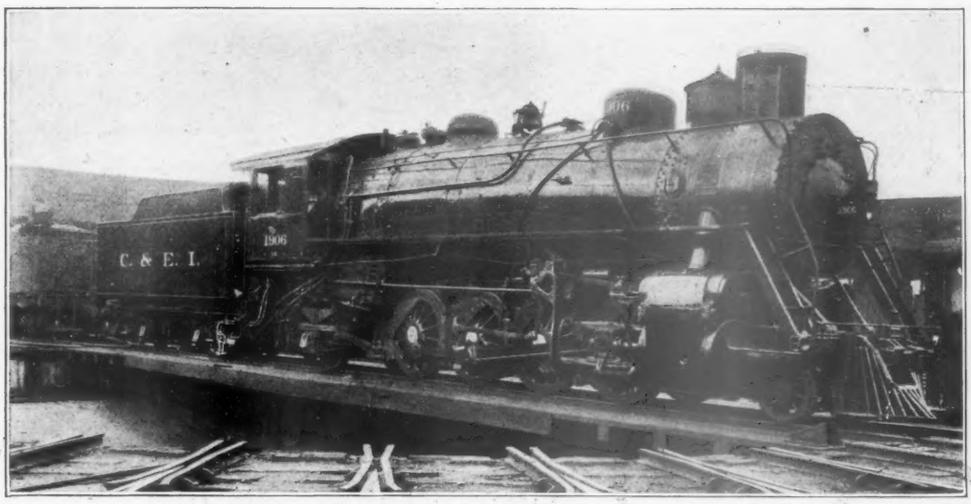
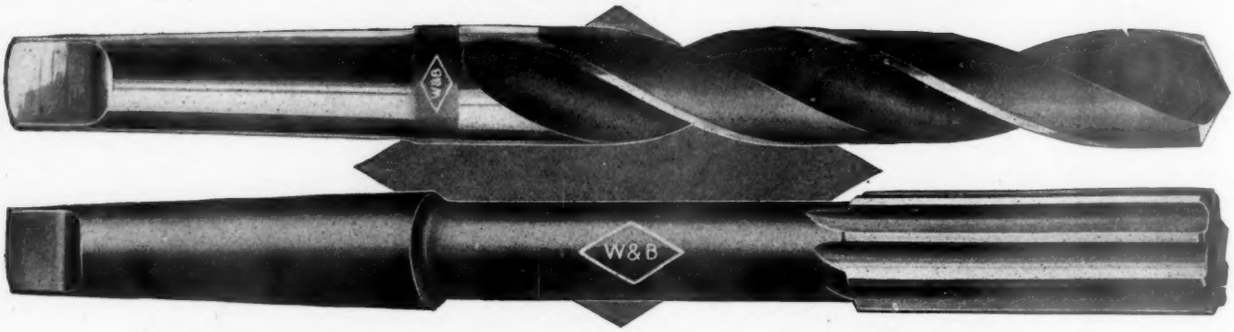


Tried and found Not Wanting

Chicago & Eastern Illinois Mikados with their 4300-ton rating are among the most conspicuous examples of Miller Train Control efficiency. All engines running over the Chicago Division have been equipped with the Miller Control for the past four years, and the service records furnish positive proof that the Control is both dependable and desirable. Moreover, the Miller Train Control is easily and readily adapted to meet special operation requirements on different roads.

STAUNTON, VA. **Miller Train Control** DANVILLE, ILL.



An Opportunity and a Guaranty

W&B

Trade Mark Reg. U. S. Pat. Off.

Here is a life insurance policy on Twist Drills, Reamers and Screw and Drop Forged Wrenches. Steel-stamped into every tool we make, this Trade Mark is a safe and sure guaranty of successful and economical performance.

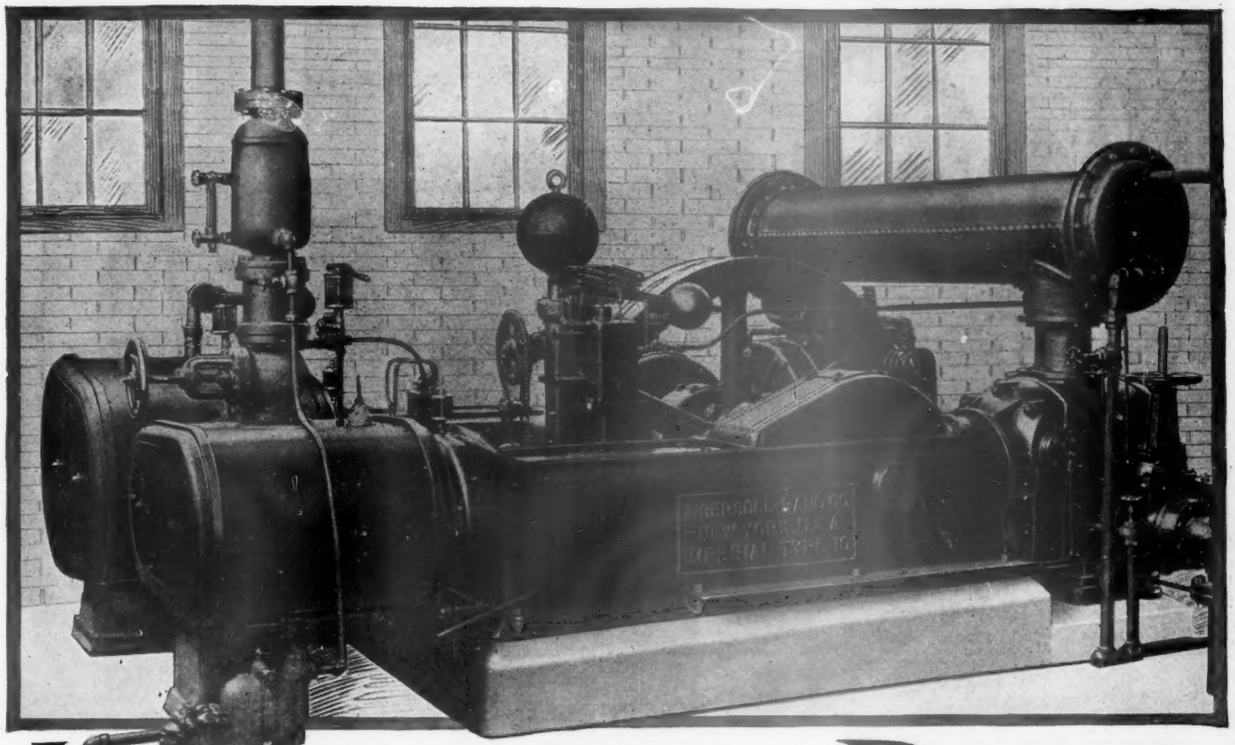
THE "W & B" Trade Mark is our signature on the tools we make. It makes good. Before it is stamped on a Twist Drill or Reamer, we have made sure that the tool is up to our standard, and our standard is the highest in the world.

Buying "W & B" Twist Drills and Reamers is an opportunity open to all who want the most for their money. The "W & B" Trade Mark is our guaranty that you get the most for the money.

There is no question in any efficient shop about the goodness of "W & B" tools. The best things ever said about "W & B" Twist Drills and Reamers have been said by those who use them.

The Whitman & Barnes Manufacturing Co.
General Offices: Akron, O.
Factories: Akron, O., Chicago, Ills., St. Catharines, Ont.

Established 65 Years
Whitman & Barnes
TWIST DRILLS — REAMERS — WRENCHES — DROP FORGINGS



INGERSOLL-RAND

"IMPERIAL" TYPE "XPV" COMPRESSORS

Built to meet the need for a steam driven unit to deliver from 608 to 4219 cu. feet of air at pressures to 110 lbs. per sq. in.

STEAM ECONOMY IS ITS OUTSTANDING FEATURE

Balanced piston steam valves and automatic cut-off control permit the attainment of a remarkably low rate of steam consumption. This means lower boiler horse power needed and money in the owner's pocket. Their design also permits the use of high steam pressures and superheat—no valve warping and leakage—perfect balance minimizes the valve driving power requirement and facilitates lubrication. Steam valve chests have easily and inexpensively renewable bushings.

Users Include Such Companies as:

Philadelphia & Reading Coal & Iron Co.
Merchants Shipbuilding Corporation.
Baltimore & Ohio R. R. Co.
Spicer Mfg. Co.
Brown & Sharpe Mfg. Co.
Jones & Laughlin Steel Co.
Pusey & Jones Co.
E. I. Du Pont de Nemours Co.
Buda Motor Co.
Corning Glass Works.
Diamond Alkali Co.
Public Service Corporation (N. J.)

There are other features of design about which you will want to know

Ask for Bulletin No. 3033

361-C

INGERSOLL-RAND COMPANY

GENERAL OFFICES, 11 BROADWAY, NEW YORK

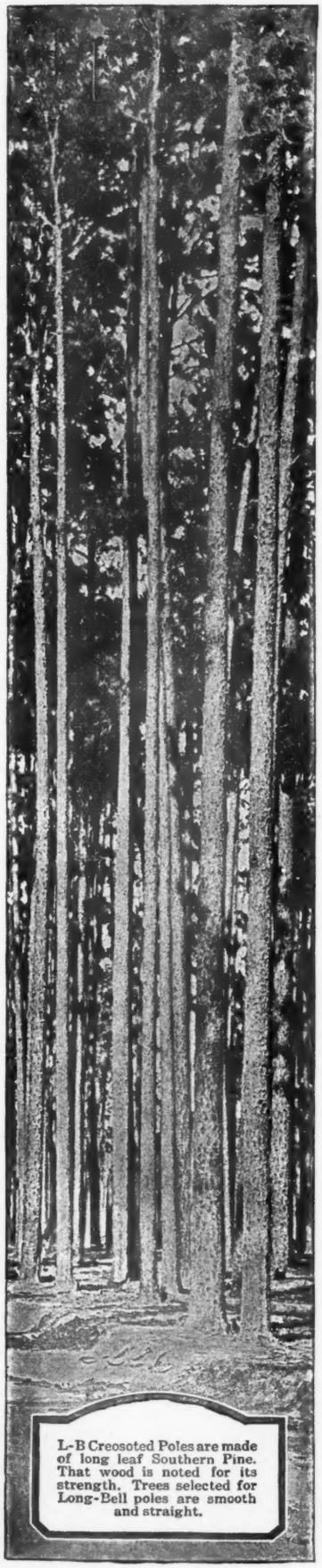
DOMESTIC OFFICES

BUTTE, JUNEAU, DULUTH, DENVER, BOSTON, EL PASO, SEATTLE, ST. LOUIS, CHICAGO, NEW YORK, KNOXVILLE, SCRANTON, HOUGHTON, CLEVELAND, PITTSBURGH, BIRMINGHAM, LOS ANGELES, DETROIT, NEW ORLEANS, PHILADELPHIA, SAN FRANCISCO, SALT LAKE CITY, JOPLIN

FOREIGN OFFICES

LONDON, PARIS, MADRID, MILAN, RIO DE JANEIRO, MONTREAL, MEXICO CITY, MELBOURNE, KALGOORLIE, JOHANNESBURG, SANTIAGO, CHILE, LIMA, PERU, KOBE, JAPAN, MANILA, TOKIO, HONOLULU, HAVANA, BUENOS AIRES, ANTOFAGASTA, LA PAZ, BOLIVIA, VANCOUVER, B. C.

APPLY TO NEAREST OFFICE



L-B Creosoted Poles are made of long leaf Southern Pine. That wood is noted for its strength. Trees selected for Long-Bell poles are smooth and straight.

Poles That Resist Decay, Storm and Fire

Continuous, uninterrupted service over transmission lines, electric railways, telephone and telegraph lines, depends largely upon *poles*. If the poles decay; if they break under sleet and storm; if they succumb to grass fires, they reduce efficiency and destroy service—the main asset of public utilities.

Long-Bell Air-Seasoned, Creosoted Long Leaf Southern Pine Poles are *decay proof*. They give service for upwards of fifty years. They stand in the face of wind and sleet that make short work of ordinary poles. They are unaffected by grass fires.

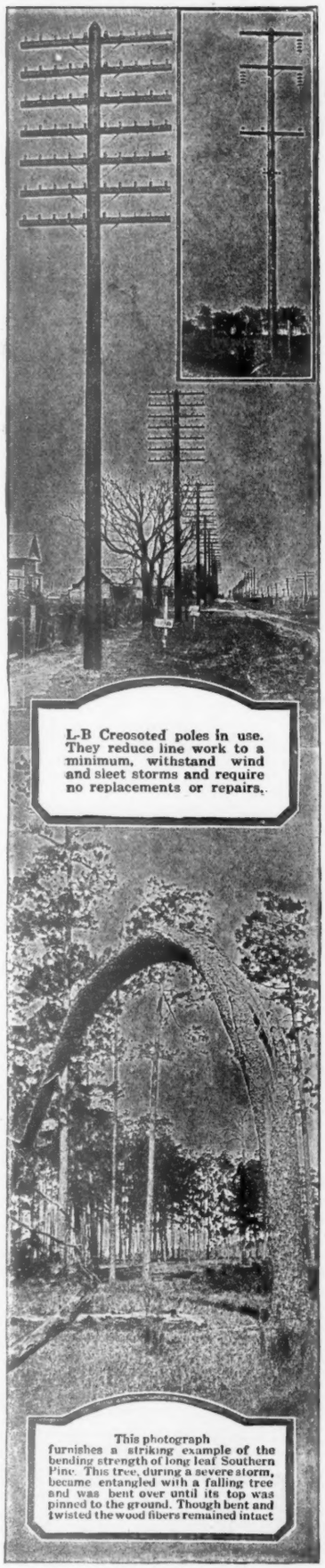
Long-Bell Poles are not merely dipped or butt-treated. They are placed in air-tight cylinders, and distilled creosote—the greatest wood preservative known—is forced into the wood under tremendous pressure. The entire sapwood is thoroughly impregnated. This preservative, added to the natural strength and the straight, sturdy, smooth Southern Pine, makes a pole without equal.

Every pole is branded with the L-B mark—a symbol of the very highest quality.

Officials responsible for service should send at once for this free booklet: "Poles That Resist Decay"

The Long-Bell Lumber Co.
5966 R. A. Long Bldg. KANSAS CITY, MO.

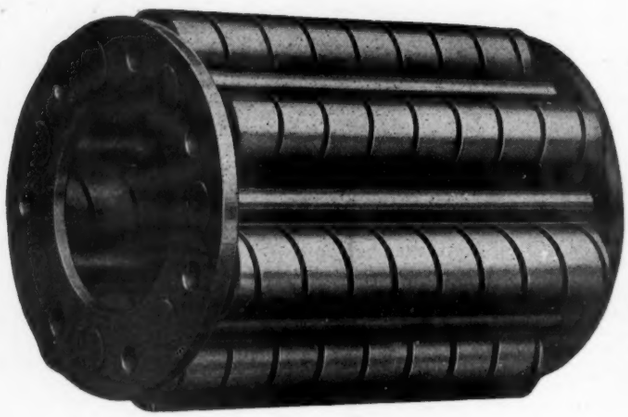
Manufacturer of *Creosoted Poles, Fence Posts, Ties, Piling, Wood Blocks* and *Creosoted Lumber*; Southern Pine Lumber, Hardwood, Oak Flooring; California White Pine, California White Pine Sash and Doors, Screen Doors, 3-ply Veneers and Box Shooks



L-B Creosoted poles in use. They reduce line work to a minimum, withstand wind and sleet storms and require no replacements or repairs.

This photograph furnishes a striking example of the bending strength of long leaf Southern Pine. This tree, during a severe storm, became entangled with a falling tree and was bent over until its top was pinned to the ground. Though bent and twisted the wood fibers remained intact

HANDLING MATERIAL AT



READ WHAT -THIS- BEARING

IT WILL DO THE SAME

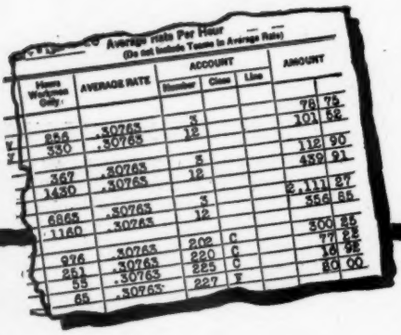
Hyatt Roller Bearings applied to your freight house trucks will save time and money. They will enable you to handle your freight faster, more economically and with fewer men.

The Hyatt Roller Bearing Equipped truck shown above is used in quantities by the Edward G. Budd Manufacturing Company of Philadelphia, Pennsylvania. It differs somewhat from freight handling trucks but its principle is of course the same.

Mr. Sonneborn, the floor superintendent of this company, recently told a Hyatt Engineer that they handle nine million pounds per month over a distance of 400 feet, at an average cost of 9c. per thousand pounds. This remarkable amount of work at such a low cost is made possible by the Hyatt Roller Bearings on the trucks.

HYATT BEARINGS FOR

MONROE



Hours Worked on Daily	AVERAGE RATE	ACCOUNT Number	Class	Line	AMOUNT
					76 75
246	.30765	3			101 52
330	.30765	12			
					112 90
		5			439 91
367	.30765	12			
1430	.30765				2,111 27
		3			556 85
6865	.30765	12			
1140	.30765				300 85
		202	C		77 22
976	.30765	220	C		18 56
261	.30765	255	C		80 00
55	.30765	227	F		
65	.30765				

The Monroe Saves "Big" on Labor Distributions

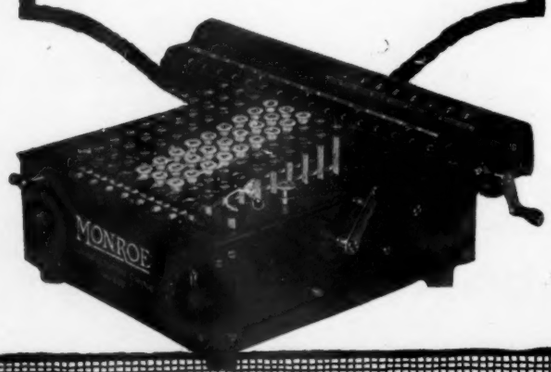
IF the writer of this advertisement came to your office and offered to work for you, and proved that he could do twice the amount of work that any one of your clerks is now doing for a fraction of his salary, you would be interested?

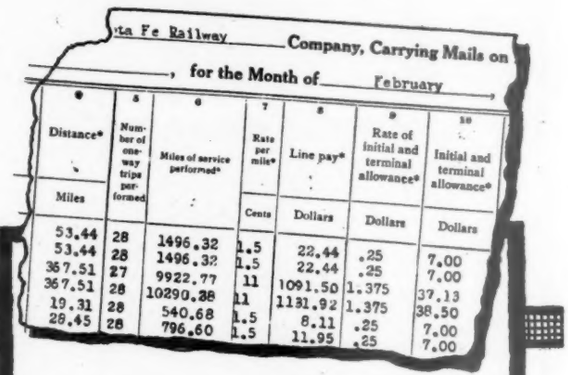
This is just what we propose to show you—*"One clerk with the Monroe Calculating Machine can figure our labor distributions that formerly took from three to ten clerks one day or more and performs the work from 10 to 20 times faster."*

This is not idle boast but a FACT that has been proved on one of the largest railroads of the country.

No matter what your work is, a "try-out" will convince you that the MONROE *not only Adds, but Multiplies, Divides, and Subtracts as easily as other machines Add.*

Compare the MONROE time of 40 seconds to figure the distributions shown, with any other method, and remember, MONROE Results are *Checked* and *Proved* the First Time.





ta Fe Railway Company, Carrying Mails on
for the Month of February

Distance* Miles	Number of one-way trips performed	Miles of service performed*	Rate per mile* Cents	Line pay* Dollars	Rate of initial and terminal allowance* Dollars	Initial and terminal allowance* Dollars
53.44	28	1496.32	1.5	22.44	.25	7.00
53.44	28	1496.32	1.5	22.44	.25	7.00
367.51	27	9922.77	11	1091.50	1.375	37.13
367.51	28	10290.38	11	1131.92	1.375	38.50
19.31	28	540.68	1.5	8.11	.25	7.00
28.45	28	796.60	1.5	11.95	.25	7.00

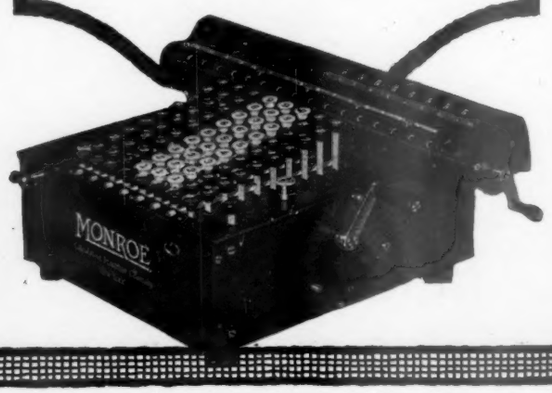
The Monroe Speeds Up Mail Service Reports

PAGE on page of mail routes An endless chain of multiplications and additions. No wonder that it takes a clerk from 10 to 30 days to get out these reports with pad and pencil.

And it's on just such "brain-wearing" reports that the MONROE with its simple Forward and Backward mechanism, will prove its value—taking from you and your clerks the entire burden and shifting it to a machine where you know as you go your answers are correct.

A FEW REASONS: (1) It is the only *FOUR-IN-ONE* machine with a keyboard that does not require the use of complements, reciprocals and other set rules in figuring. (2) Every operation is direct and as simple as pencil and pad. (3) A simple Forward turn of the crank to Add or Multiply and an equally simple reverse turn to Subtract or Divide.

Just to get a line on MONROE speed, the above section of a Report was figured in 1½ minutes. Compare it with pad and pencil time or your present method!



CALCULATING MACHINE

MONTH THIS YEAR	MONTH. LAST YEAR	INCREASE OR DECREASE	PER CENT.
38,838.92	20,591.72	18,247.19	88.61
4,879.17	649.50	4,229.67	651.22
8,177.37	1,604.54	6,572.83	409.64
1,644.42		1,644.42	
187.50	917.26	729.76	79.56
76.18	94.17	17.99	19.10
5,905.04	1,043.63	4,861.41	465.82

Prorate among six railroads $282.21 the amount of freight paid for a certain shipment the proportion due each road being as follows:-

A --- 15% --- 5%
B --- 23% of the Bal.
C --- 52.7% of the Remainder
D --- 40% 41.66%) 47.3% of the remainder
E --- 60%)
F --- 58.34%)

A - $40.22 : B - $ 55.66 : C - $ 98.21
D - $14.69 : E - $ 22.03 : F - $ 51.43

The Monroe "Eats Up" Percentage Work

WHEN figuring percentages, Accuracy along with Speed is necessary. It's ideal work for the MONROE because you cannot register a figure without the MONROE Visible Check safe guarding you—enabling you to detect and correct any error the minute you make it. The MONROE proves your work as you go.

As to Speed, could you figure that portion of the percentages shown—check and prove them in 1¼ minutes? You could with a MONROE.

The two way mechanism of the operating crank—forward for addition and multiplication and backward for subtraction and division reduces every mathematical calculation to a direct and simple process. That is why no experienced operator is necessary to use the MONROE.

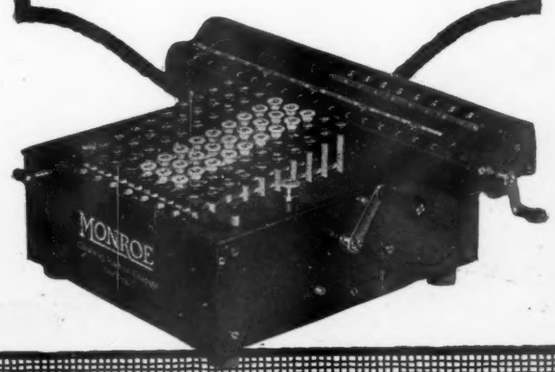
Likewise, the Monroe For Pro-Rating

A LARGE volume of your work is Pro-rating and here again the MONROE can prove that it is the easier, safer route to the desired end—Accurate Results. It eliminates all need for mental calculation or strain.

For example, in the problem illustrated, the entire figure-job is done on the MONROE—without touching a pencil to paper, except to jot down the results—in less than one minute.

These are just a few demonstrable facts why the MONROE is making such rapid strides with the railroads. Practically every one of the leading systems have from 1 to 100 MONROES in use—saving thousands of dollars yearly in time, labor and elimination of costly errors.

Simply use attached coupon and get the full facts. It will pay you.



The "SHOW ME" Coupon-Mail it today

Monroe Calculating Machine Co.,
Woolworth Bldg., New York City.

Without obligating us, please send
(Check items desired)

☐ Copy of your "Book of Facts"
☐ Copy of your folder "Engineering Formulae—How to Put the Burden on the Machine Where It Belongs."
☐ Please arrange for a demonstration in our office of our own work.

Name of R. R. .....
Address .....
Individual's Name .....
Title .....

R. A. 6-27-19

25,000,000 Chilled Iron Wheels in Service

Standard for 69 Years

The Chilled Iron Wheel has performed its every function at a minimum cost.

FOR FREIGHT CARS

95 PER CENT. of all cars in this type of service are equipped with Chilled Iron Wheels, provided for by the MASTER CAR BUILDERS' STANDARDS, as follows:

625	lb.	Wheel	for	Cars	of	30	tons	capacity
700	"	"	"	"	"	40	"	"
725	"	"	"	"	"	50	"	"
850	"	"	"	"	"	70	"	"

FOR STREET CARS

The Chilled Iron Wheel is Standard for Street Car Service in 95 PER CENT. of all cities in the United States and Canada, operating 100 cars or over.

THE REASON

Chilled Iron Wheels possess a graded hardness of structure, which is ideal for service, namely: HARD TREAD, SOFT PLATES AND SOFT HUB; Chilled Iron will not CRUSH OR FLOW under heavy loads.

A demonstration of the BEARING POWER OF CHILLED IRON is found where heavy hoisting cranes are operated, each wheel carrying 105,000 pounds.

Chilled Iron Wheels under cars of 70 tons capacity are only required to carry 25,000 pounds each.

THE CONCLUSION

The uninterrupted use of Chilled Iron Wheels for 69 years under 95 PER CENT. of the nation's equipment proves that no other material can match them for economical and dependable service.

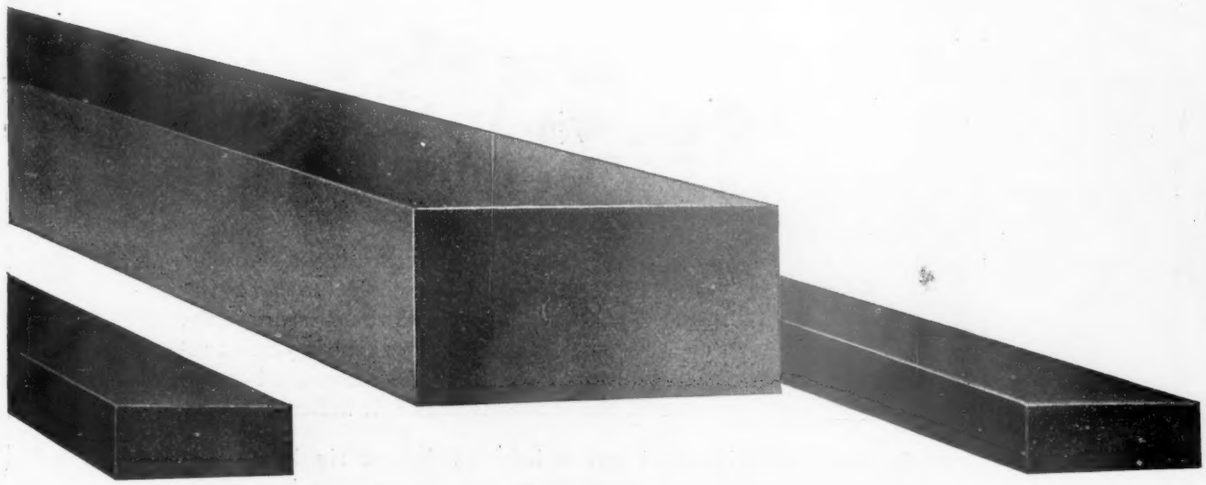
The Wonderful Single Service Chilled Iron Wheel

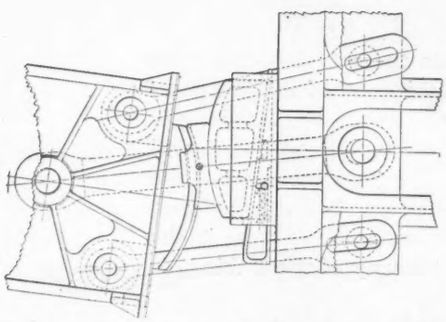
ASSOCIATION OF MFRS. OF CHILLED CAR WHEELS

1229 McCORMICK BLDG., CHICAGO

Representing forty-eight wheel foundries through the United States and Canada. Capacity 20,000 Chilled Iron Wheels per day.

ORDINARY DRAW BAR AND SAFETY BARS





Ordinary Draw Bar, with Slotted Safety Bars.

Slotted bars or safety chains always fail singly.

When the draw bar fails and they are called on for protection the shortest one snaps, then the other snaps.

Real protection they cannot give.

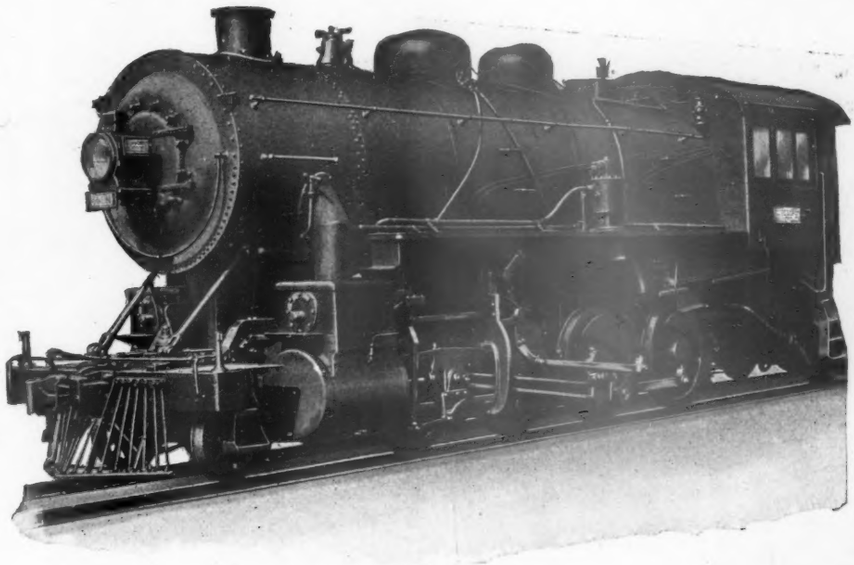
Their combined size is never equal to that of the draw bar and the nature of their fastenings preclude sufficient strength to hold.

Look at the safety bar on the other page, just as strong as the draw bar and fastened with the same stout pin.

Then decide which you would rather have on an engine you rode.

Franklin Railway Supply Company, Inc.

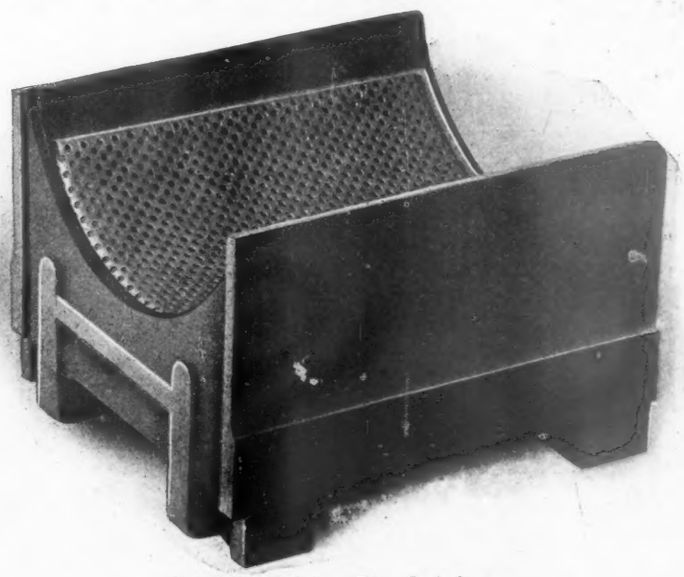
30 CHURCH STREET NEW YORK



ECONOMY THAT PAYS

Do you realize that the projected area of rod bushings and driving box brasses represents 50% of the total moving parts on the locomotive to be lubricated?

If half your locomotives are lubricated with grease at sixty cents per 1,000 miles using grease, why should your total costs be so high?



Franklin Driving Box Lubricator

Twenty-five per cent of the total engines in the country are still using the antiquated oil and waste method of lubrication.

Perhaps a large number of your engines are AMONG them.

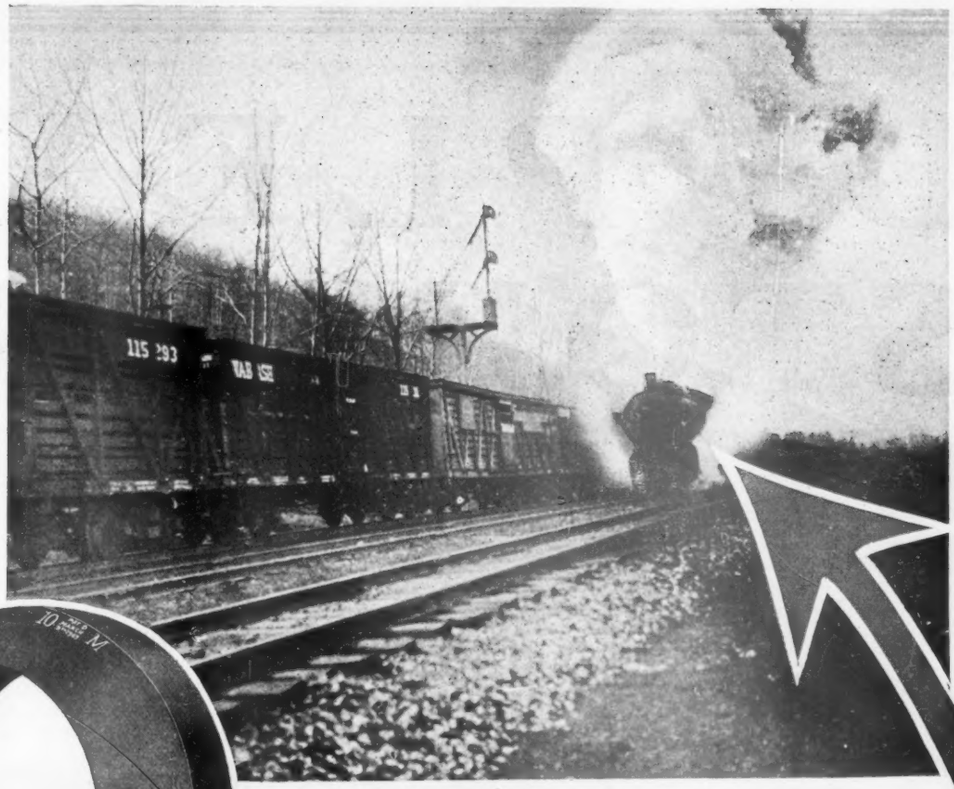
Franklin Driving Box Lubricators reduce lubricating costs, eliminate delays and at the same time reduce your labor costs by releasing capable men for other important work.

Franklin Railway Supply Company, Inc.

30 CHURCH ST. NEW YORK

332 South Michigan Avenue
Chicago

In Canada: Franklin Railway Supply Co. of Canada, Ltd.
Montreal



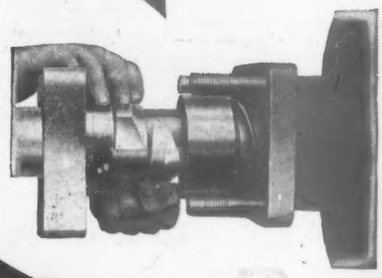
KING Would Prevent This

THE wisdom of your selection of a packing depends upon its ability to meet all conditions to which it may be subjected—to successfully withstand the grief of hard—and unusually exacting service.

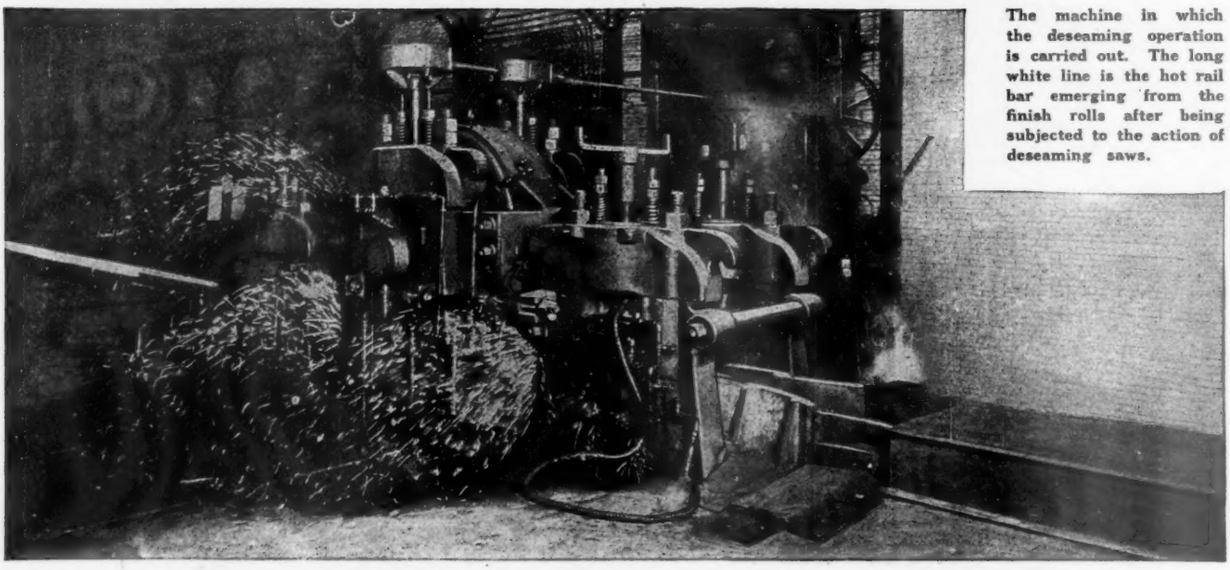
A packing that will do this without frequent examination and refitting, is invaluable.

Equipping power with King Metallic Packing is a guarantee of dependable performance.

For piston rods—valve stems and air pump piston rods King is constantly proving its superiority on leading railroads.



The United States Metallic Packing Co.
PHILADELPHIA PA.

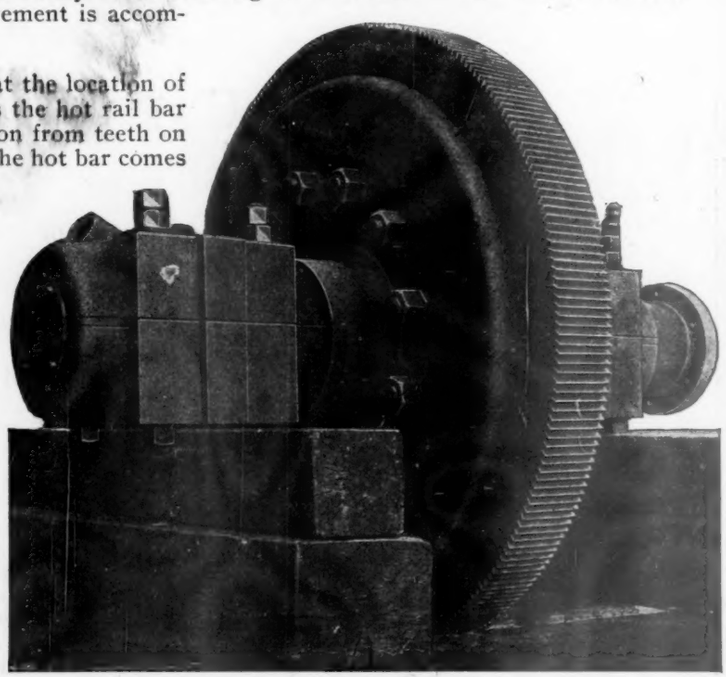


The machine in which the deseaming operation is carried out. The long white line is the hot rail bar emerging from the finish rolls after being subjected to the action of deseaming saws.

This Is the Lackawanna Deseaming Machine, Which Cuts Off the Weak Metal That Ruins Running Surface and Starts the Cracks in Rails Made in the Ordinary Way.*

OUR previous two-page advertisements have made plain the necessity for removing the weak laminated partially decarburized metal at the head and base of rails, in order to secure a harder longer-lived running surface and a greater safety from cracking and fracture. This announcement will explain how the desired metal improvement is accomplished in the Lackawanna Process.

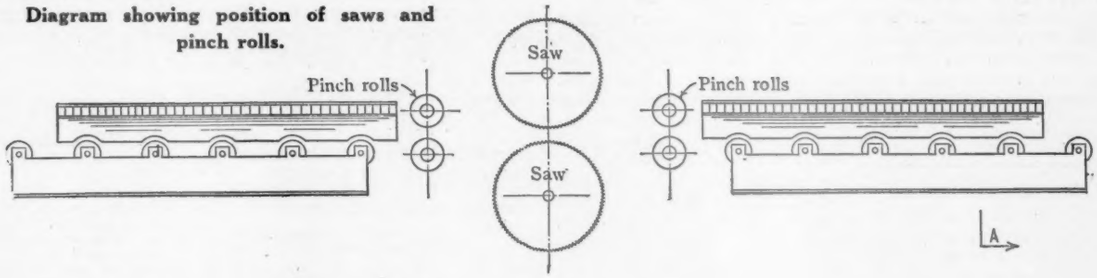
The machine by which the weak metal at the location of the rail head and base is removed subjects the hot rail bar on top and bottom surfaces to cutting action from teeth on two opposed rotating saw discs, just after the hot bar comes down the mill table from the last roughing pass. During this stage of travel a collar roll turns the rail bar so that its head is down and the base up. The bar then enters a tunnel about 20 feet long and lined with fire brick to check heat radiation. (See diagram on opposite page). It is then forced between the saw discs by a pair of driven pinch rolls, adjustable to bars of various sizes and having guides for the top, bottom and sides of the bar. Adjustment of the saws is made for a cut ⅛ inch or at the extreme 3/16 inch deep. A second set of driven pinch rolls, on the delivery side, helps to force the bar against the cut of the saw teeth and similarly a second set of guides here helps to hold the bar rigidly and firmly during passage through the saw. From the delivery



Upper saw disc taken from the machine.

**One of a series of talks on Better Rails. Follow them.*

Diagram showing position of saws and pinch rolls.



set of pinch rolls the bar travels through about 40 feet more of tunnel similar to that on the entering side and then goes on its way to the stand of finishing rolls. The hot bar enters the saw at a speed of about 350 feet per minute, is slowed down by the cutting operation to about 79 feet per minute, and on leaving the saw rapidly picks up speed until it enters the finishing stand at about 500 feet per minute.

The upper saw disc (operating on the base of the bar) has an 8-inch and the lower (operating on the head) a 6-inch face. Both are driven from belted motors, are 5 feet in diameter and run at a peripheral speed of 25,000 feet per minute, or, in other words, both discs together make 800,000 tooth contacts with the bar per minute. The capacity of the machine is 170 tons of rails per hour.

All Lackawanna Rails of 50 pounds per yard and heavier are now deseamed by this process, which in connection with high chemical purity makes the Lakawanna product unquestionably superior to any rails that have ever been offered.

Watch for our following announcements which will give interesting data on rail performance, and send for our book "The Lackawanna Deseaming Process."

Showing the position in which the partially finished rail bar travels between the saws, and the extent to which soft metal is removed at the head and base.

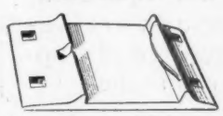
ALL LACKAWANNA RAILS ARE DESEAMED

Other Lackawanna Aids to Better Track

The Lackawanna Safety-Head Angle Bar

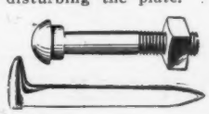
overcomes liability to wear and fracture by preventing cutting of the bar at the top from back action or upward thrust of the rail ends. This is accomplished by a slight depression in the head of the angle bar for a short space at the center where the rail ends meet.

The Lackawanna Hook-Shoulder Tie Plate



is simple, strong, durable, convenient for installation, and by holding the rail with great security prevents undue wear and destruction of material, saves repair costs and reduces maintenance labor.

Two ribs on top form a channel in which the rail base rests. One of the ribs is plain and the other hooked to make a holder. One or two plain spikes on the plain rib complete the bond between plate and both rail flanges. The plate is fastened to the tie by independent plain or screw spikes. The rail may be removed without disturbing the plate.



Lackawanna Track Bolts and Spikes

Our track bolts and spikes of all standard sizes for light or heavy rails, enjoy an enviable reputation for careful, accurate workmanship and finish.

The Abbott Rail-Joint Plate

strengthens and otherwise improves ordinary angle bar joints of standard and light tee and girder rails. Its use assures smooth running track surface without the necessity of constantly raising and tamping the joint ties, avoids annoyance and expense from worn and broken bolts and angle bars and protects the rail ends from battering and breaking down.

The hard steel and combination of reversed flanging within the plate provides for internal stresses and imposes the load on the two joint ties with about the same action as between a short deck bridge and its piers. Upturned corner lugs engaging the ends of the angle bars act as anti-creepers and as rail guards to prevent misalignment if the angle bars break or become loose.

Abbott Plates are equally applicable to and advantageous on new or relaid track and will extend the life even of old track for several years.

These plates are made in types especially suitable for ordinary steam railway service, for use in paved streets and for welding to the rail base, and may be held with either screw or ordinary spikes.

Write for our booklet

"Improved Track Appliances"

Lackawanna Steel Company

General Sales Office and Works: Lackawanna, N. Y.

Atlanta Boston Buffalo Chicago Cincinnati Cleveland Detroit New York Philadelphia St. Louis San Francisco

Sole Exporter of Our Commercial Products: Consolidated Steel Corporation, 165 Broadway, New York

418

POSITION OPEN

TRAVELING SALESMAN wanted by well established injector and lubricator manufacturer, must have mechanical experience. Address Box 935, Railway Age, New York, N. Y.

PROFESSIONAL MEN—Technical Men — Executives — Fighting Specialists of the Army and Navy. For men who will make good in your organization write to the Re-Employment Bureau of New York City, 505 Pearl Street, New York City, Professional, Technical and Executive Division.

IF ACTUALLY QUALIFIED for salary between $2,500 and $25,000, communicate with undersigned, who will negotiate strictly confidential preliminaries for such positions; executive, administrative, technical, professional; all lines. Not an employment agency, undersigned acts in direct confidential capacity, not jeopardizing present connections. Established 1910. Send name and address only for explanatory details. R. W. Bixby, 302 Lockwood Bldg., Buffalo, N. Y.

POSITION OPEN

ACCOUNTANT: Railroad—Experienced in general statistics, general accounts or disbursements. Man employed doing work of above character preferred. Excellent opportunity for the right party. Give age, experience, present position and salary in first letter. Address Box 938, Railway Age, Woolworth Bldg., New York, N. Y.

ACCOUNTANTS: A leading Eastern Corporation has vacancies for several experienced disbursement accountants, men with railroad experience in both general and division offices preferred. A thorough knowledge of shop, supply store, payroll and material accounting is necessary. Give experience in detail, age, salary required, references, etc., in reply. Address Box 937, Railway Age, Woolworth Bldg., New York, N. Y.

LARGE locomotive firm will shortly require the services of a thoroughly experienced works manager conversant with the best modern practice. Liberal salary and exceptional prospects to suitable man. Address "Locomotive," Wm. Porteous & Co., Advertising Agents, Glasgow, Scotland.

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WANTED—Young man experienced in handling claims, for position in Auditor's office, Short Line. Salary $125.00 to start. Reply giving details. Address Box 939, Railway Age, Woolworth Bldg., New York, N. Y.

POSITION WANTED

PARTY with 28 years' experience handling Mountain Prairie and Terminal Railroads as Superintendent and Manager, thoroughly capable of caring for the economical operation and upkeep of equipment, track, bridges and buildings, splendid handler of labor, wants management of short line railroad. Salary no particular object until results are shown. Address Box 936, Railway Age, Woolworth Bldg., New York, N. Y.

EMPLOYERS—Send us your inquiries for men of technical training and experience. We are obtaining employment for soldiers, sailors and marines released from service. Re-employment Bureau of New York City for Soldiers, Sailors and Marines, 505 Pearl Street, north of Municipal Building, Professional Section, Worth 9250.

POSITION WANTED

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THOSE interested in increasing their knowledge of practical railroad work should send for our Free Special Bulletin, describing our instructional methods. $1.50 per month covers all expense for text books, instruction, etc. Investigate this opportunity to increase your earning capacity. The Railway Educational Bureau, Omaha, Nebr.

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All classes of ship construction and Shipyard Plant Construction equipment and material including large quantities of

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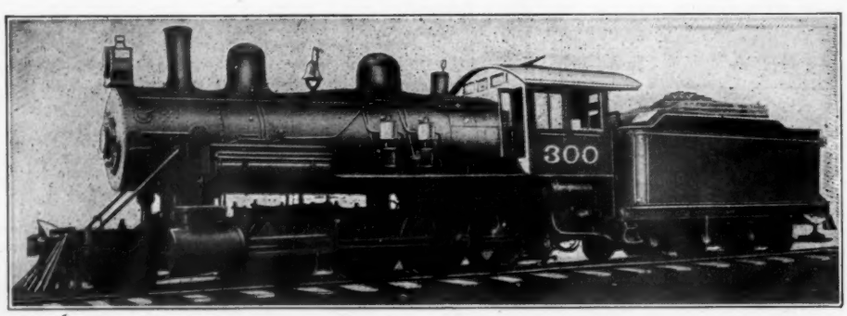
Salvage—United States Shipping Board Emergency Fleet Corporation
140 North Broad Street, Philadelphia, Penna.

Your card in the Get-Together Department will bring results.



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LOCOMOTIVES, all types. COACHES—FREIGHT CARS, new and used. NEW CABOOSES with steel center sills.
All our equipment is in FIRST CLASS condition and PROMPT DELIVERIES assured.
WE are EXPORTERS in the market for railroad equipment of all kinds.

GRAY & SON, Inc.
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WILLIS E. GRAY, President.

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All the Equipment of the Central Railroad of Pennsylvania

Including 4,000 tons of 70 lb. rail, frogs, switches, 4 locomotives, passenger cars, spikes, for quick shipment; also bridges, machine shop and tools of various kinds. Will make attractive prices to move quickly.

M. K. FRANK
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Addition to power house, built by The H. K. Ferguson Co., for The National Cash Register Co., Dayton, O.

IF it is desired that the vacant spaces be transformed to conform with existing buildings, Ferguson Designing and Alteration Engineers will plan an addition that will meet the Railroad's every requirement.

In the planning of additions, special attention is given to the achieving of economy in cost, combined with highest quality workmanship.

A Ferguson addition maintains the same high reputation that has been justly earned by all Ferguson Standard and Special Buildings.

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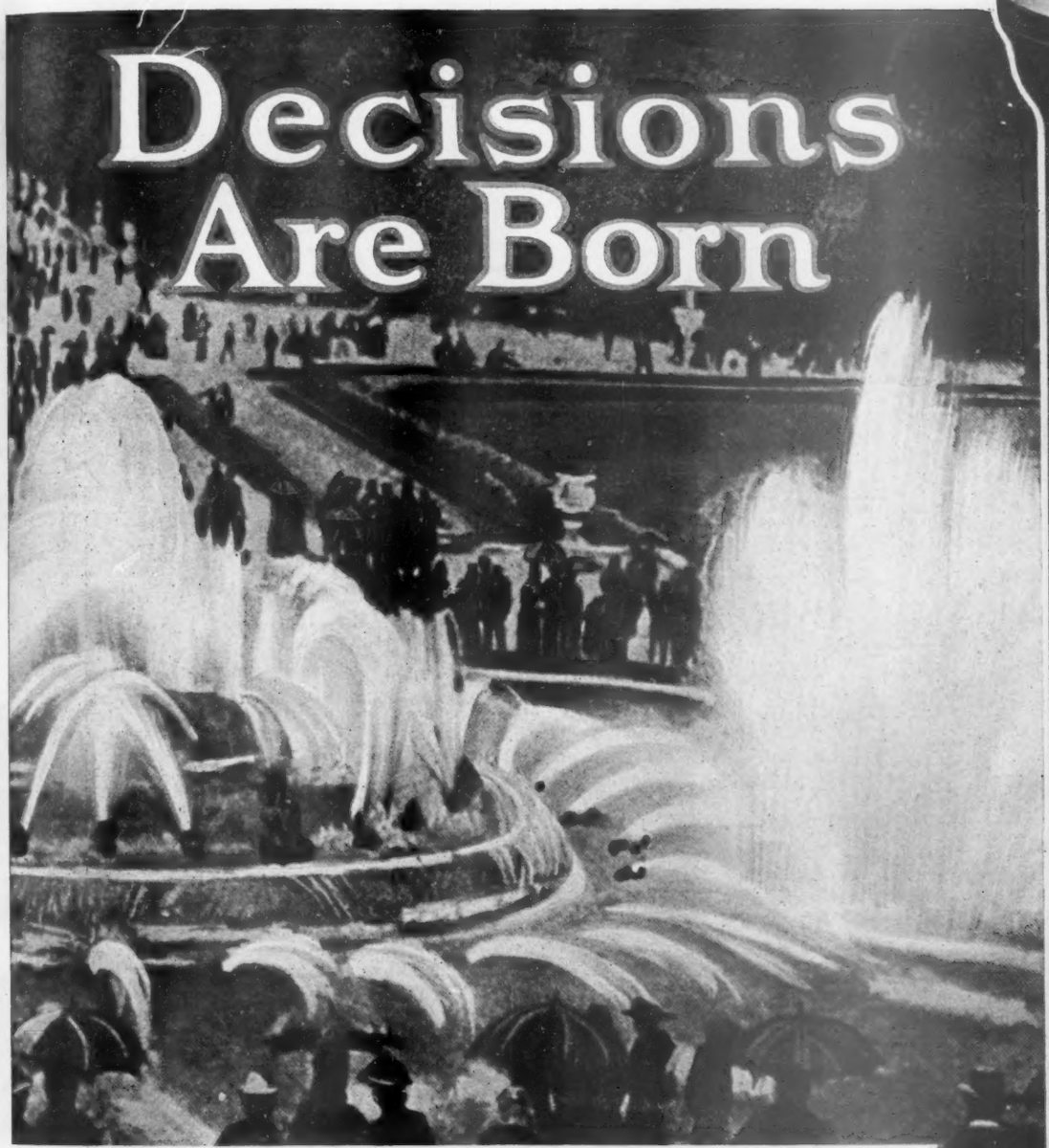
The H. K. Ferguson Company

Engineers and Builders. Railroad Department

6523 Euclid Avenue CLEVELAND Rosedale 6854

Buildings

DESIGNED, BUILT AND EQUIPPED



Decisions Are Born

OUT of the deliberations of Statesmen, Generals and Admirals, those men who day after day, week after week have striven for a just settlement—there comes from Versailles this message of Peace.

Peace! Men's faces reflect it, just as it seems reflected in the silvery spray of "Les Grandes Eaux" at Versailles, those fountains, *which for more than two and a half centuries have brought the peace which comes from the perfect service of Cast Iron Pipe.*

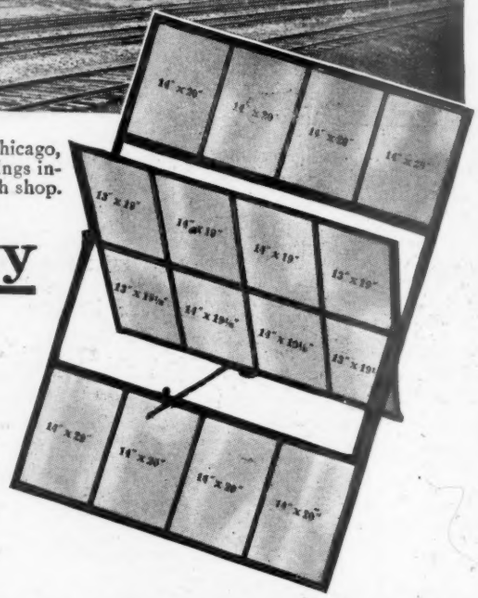
PUBLICITY BUREAU

New York

Fenestra Stock Sash daylights and ventilates the buildings of the Chicago, Burlington & Quincy Railroad at Burlington. This group of buildings includes an erecting and machine shop, a power house and a blacksmith shop.

For Wide Adaptability

Fenestra Stock Sash



One of the most popular types of Fenestra Stock Sash. The figures on the panes indicate the glass dimensions. Note that ventilator lights abutting on the top or sides must be trimmed 1" along the abutting edge, and lights which abut on the sill must be trimmed 3/8" on the abutting edge.

WHERE particular types of buildings present peculiar construction problems, the wide adaptability of Fenestra Stock Sash easily meets requirements.

This feature of Fenestra is given practical demonstration in the group of buildings of the Chicago, Burlington and Quincy Railroad, at Burlington, Iowa.

Abundant daylight is assured in the erecting and machine shops where the nature of the work requires close application to the work on the part of the employee. Eyestrain is eliminated, good work results, wastage is decreased.

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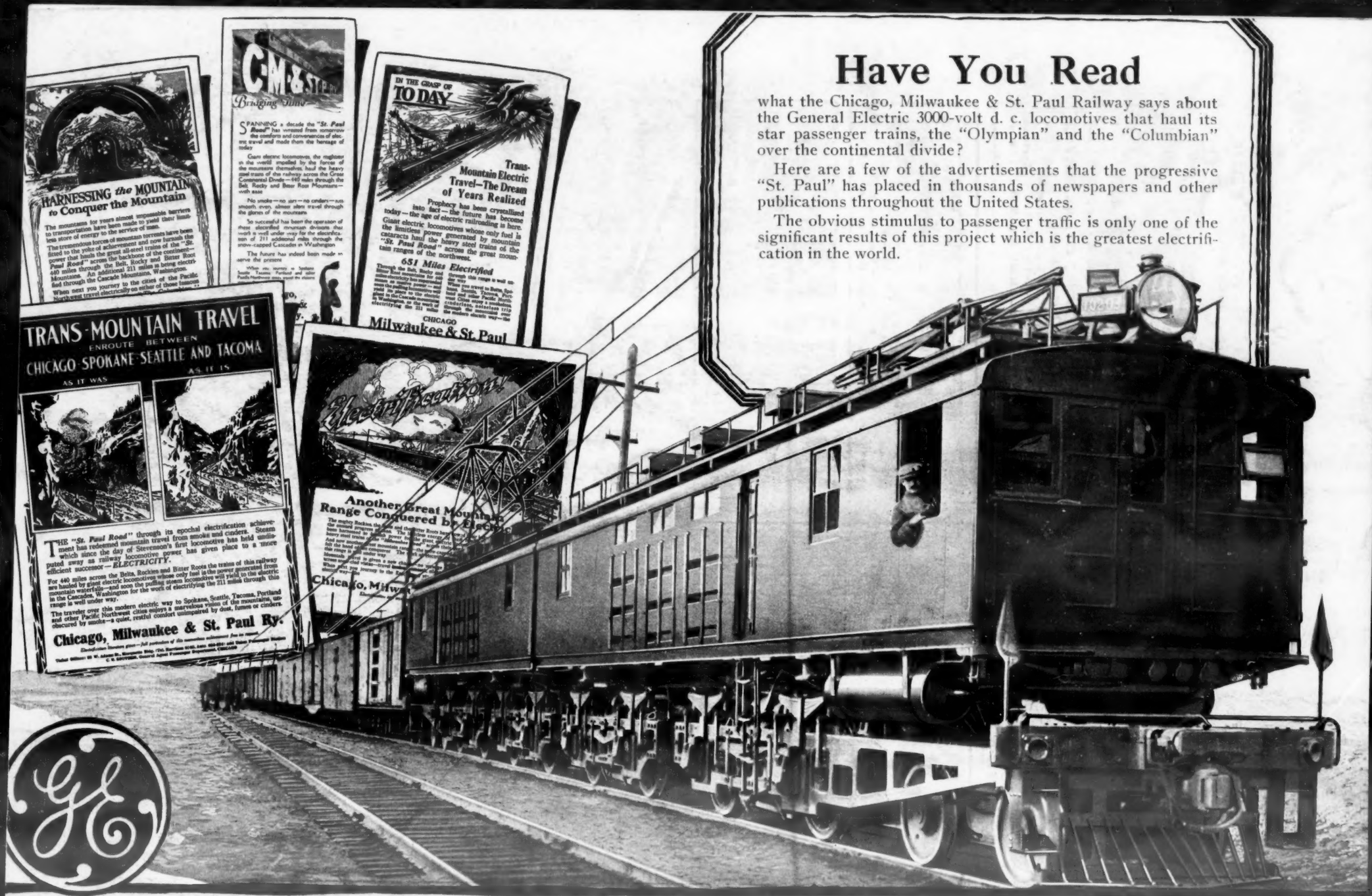
Detroit Steel Products Company
2614 East Grand Boulevard, Detroit, Michigan

Fenestra
SOLID STEEL WINDOWS



GENERAL ELECTRIC COMPANY

GENERAL ELECTRIC COMPANY